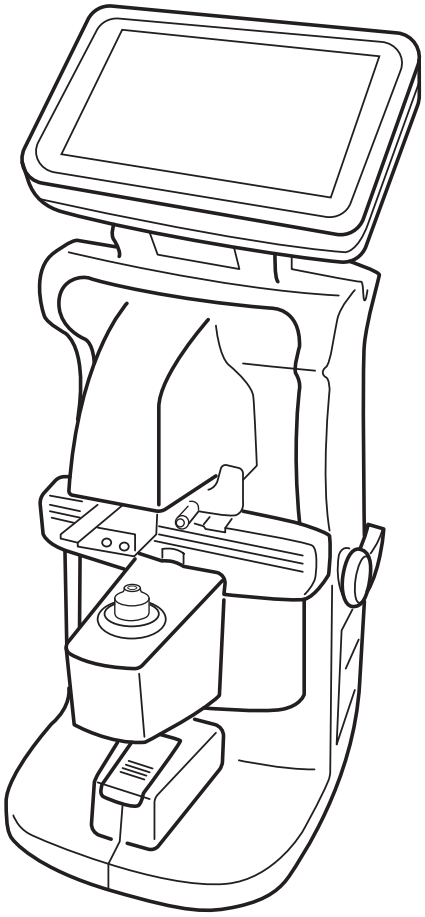
Operation Manual

ELM-9000A DIGITAL LENSMETER



ELI EZer

Table of Content

1. IMPORTANT NOTICE 1
1.1 Intended Use 1
1.2 Classifications 1
1.3 Caution 2
2. SAFETY 3
2.1 SAFETY INFORMATION 3
2.2 Symbol Information 4
2.3 Shape Of Plug 5
2.4 General Safety Information 6
2.5 Cautions in Installation , Storage and Transportion 7
2.6 Environment of installing the device 8
2.7 Labels 8
3. Features 10
4. Notes for Using the Instrument 11
5. Prerequisites for safety 13
5.1 Preparation before use 13
5.2 Preparation when you use 13
5.3 Instruction and operation sequence 13
5.4 Storage after use 13
6. Confuguration 14
6.1 Front and right side 14
6.2 Left side 15
6.3 Bottom 15
6.4 GUI (Graphic User Interface) / Display 17
6.4.1 Normal measurment mode 17
6.4.2 Progressive power lens measurment mode 18
6.4.3 MENU mode 20
7. Measurment 22
7.1 Measurement of Normal lens 22
7.2 Measurement of Glasses lens 23
7.3 Measurement of Multifocal lens 24
7.4 Measurement of Progressive lens 24
7.4.1 Preparation of measurement 24
7.4.2 Carrying out Progressive mode 25
7.4.3 Measurement of far part 25
7.4.4 Measurement of near part 26
7.5 Measurement of hard contact lens 28
7.6 Measurement of soft contact lens 28

7.7 Measurement of UV penetration ratio 28
7.8 Marking..... 29
7.8.1 The lens without astigmatism 30
7.8.2 The lens with astigmatism..... 30
7.8.3 Prism lens 30
7.9 Printing for measured data..... 30
8. SETUP mode 32
8.1 MEASURE PAGE..... 32
8.2 SYSTEM PAGE 33
8.3 DATE/TIME PAGE 34
8.4 PRINT PAGE 35
9. Self diagnosis and maintenance..... 37
9.1 Check befor asking service to sales agent.....37
9.2 Printer paper replacement method.....38
9.3 Move another place 38
9.4 Fuse Replacement..... 38
9.5 Service informaion.....40
10. Specification.....41
11. Accessory..... 42
12. Packing 43
12.1 Packing Foam Design 43
12.2 Packaging step..... 43
13. EMC (ELECTROMAGNETIC COMPATIBILITY) 45

1. IMPORTANT NOTICE

1.1 Intended Use

The **ELM-9000** is designed to measure refractive power and prism power of a lens of eyeglasses and contact lenses, to orientate and mark uncut lenses, and to verify the correct mounting of lenses in glasses frames.

1.2 Classifications

[Classification under the provision of 93/42/EEC(MDD)] Class Ⅰ
The ELM-9000 is classified as a Class Ⅰ device

[Form of protection against electric shock] Class Ⅰ
The ELM-9000 is classified as a Class I device.
This product is always protected when you connect the power cord must be connected to the protective ground included. Class I is a product in which the protection against electric shock does not rely on basic insulation only, but which includes an additional safety precaution in such a way that means are provided for the connection of the product to the protective (ground) conductor in the fixed wiring of the installation in such a way that accessible metal parts cannot become live in the event of a failure in the basic insulation. Use a power outlet which is equipped with a grounding terminal.

[Degree of protection against ingress of liquids] IPX0
The ELM-9000 is classified as a IPX0 device. Avoid exposing water to the device.

[Degree of protection against flammability]
The ELM-9000 is classified as a device not suitable to be used in a potentially flammable environment. Do not use near flammable materials

[Method(s) of sterilization or disinfection recommended by the manufacturer]
The ELM-9000 does not have any part to be sterilized or be disinfected.

[Mode of operation]
Classification of ELM-9000 : continuous operation

[Mode of transprt]
The ELM-9000 is a stationary device.

1.3 Caution

This product may malfunction due to electromagnetic waves caused by portable personal telephones, transceivers, radio-controlled toys, etc.
Be sure to avoid having objects such as, which affect this product, brought near the product.
It should be used under the supervision of medical staff of hospital
The information in this publication has been carefully checked and is believed to be entirely accurate at the time of publication. ELM-9000 assumes no responsibility, however, for possible errors or omissions, or for any consequences resulting from the No use of the information contained herein.

ELM-9000 reserves the right to make changes in its products or product specifications at any time and without prior notice, and is not required to update this documentation to reflect such changes.

	“ Do not modify this equipment without authorization of the manufacturer.” “ If this equipment is modified, appropriate inspection and testing must be conducted to ensure continued safe use of equipment”

2. SAFETY

2.1 SAFETY INFORMATION

Accessory equipment connected to the analog and digital interfaces must be certificated according to the respective IEC/EN standards (e.g. IEC/EN 60950 for data processing equipment and IEC/EN 60601-1 for medical equipment).

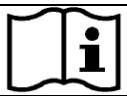
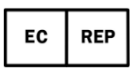
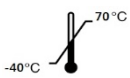
Furthermore all configurations shall comply with the system standard EN 60601-1-2:2007. Everybody who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore responsible that the system complies with the requirements of the system standard EN 60601-1-1:2001.

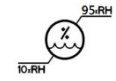
If in doubt, consult the technical service department or your local representative.

For EU Countries

- The following mark, the name & address of the EU Representative shows compliance of the instrument with Directive Council Directive 93/42/EEC of 14 June 1993 as amended by Directive 2007/47/EC concerning medical devices.

2.2 Symbol Information

Symbol	Descriptions
	Protective earth (ground)
	Alternating current
	Off (power: disconnect to the mains)
	On (power: connection to the mains)
	Do not throw away the waste to inappropriate place
	Instruction for user manual
	Operating instructions
	CAUTION
	Keep dry symbol
	DO NOT Hand Hooks symbol
	Fragile symbol
	This way up symbol
	Handle with care symbol
	Do not build up more than 2 boxes
	Manufacture
	Europe Representative
	Manufacture Date
	Only one unit in the box
	Temperature between - 40˚C ~ 70˚C

	Humidity between 10%RH ~ 95%RH
	Air pressure between 500hPa ~ 1060hPa

2.3 Shape Of Plug

Country	Voltage/frequency	Shape of plug
Mexico	110V/50Hz	Type C&E
Argentina	220V/60Hz	Type A
Peru	220V/60Hz	Type A
Venezuela	110V/50Hz	Type C&E
Bolivia & Paraguay	220V/60Hz	Type A(Most common) / Type H(Infrequently)
Chile	220V/60Hz	Type A
Colombia	110V/50Hz	Type C
Brazil	220V/60Hz 127V/60Hz	Type A Type C
Ecuador	110V/50Hz	Type C&E
USA	120V/60Hz	Type A(Hospital Grade)
Canada	120V/60Hz	Type A(Hospital Grade)

2.4 General Safety Information

If you see any warnings or cautions printed on the warning labels, follow the safety instructions in this manual. Ignoring such cautions or warnings while handling the product may result in injury or accident. Be sure to read and fully understand the manual before using this product.
Keep this manual in easy-to-access place.

Safety Symbols and sign

This indicates hazardous situations which may result in crush your hand.
This is used to emphasize essential information. Be sure to read this information to avoid incorrect operation.

2.5 Cautions in Installation , Storage and Transportion

● Exposure to the direct sunlight or too bright indoor lights may influence on the result of accurate measurment. Use the appropriate Optometry room.

● Keep the objective glass of the examinee side clean. If it was stained, it may cause on ERROR or inaccurate measurments.

● In case you leave ELM-9000 without using for certain period, disconnect the power supply and protect the unit with dust cover.

● In case moving this ELM-9000, fix the stage by using clamping bolt and stage holding knob, always keep power off, and then lift the bottom of the unit with both hands.

● In case moving this ELM-9000, do not hold forehead.

● In case moving and connect other device this ELM-9000, keep in touch with qualified technician or service agent and place the equipment plain.

● Get worked, store and move under the following environment conditions for proper operation.

● Operation environment :

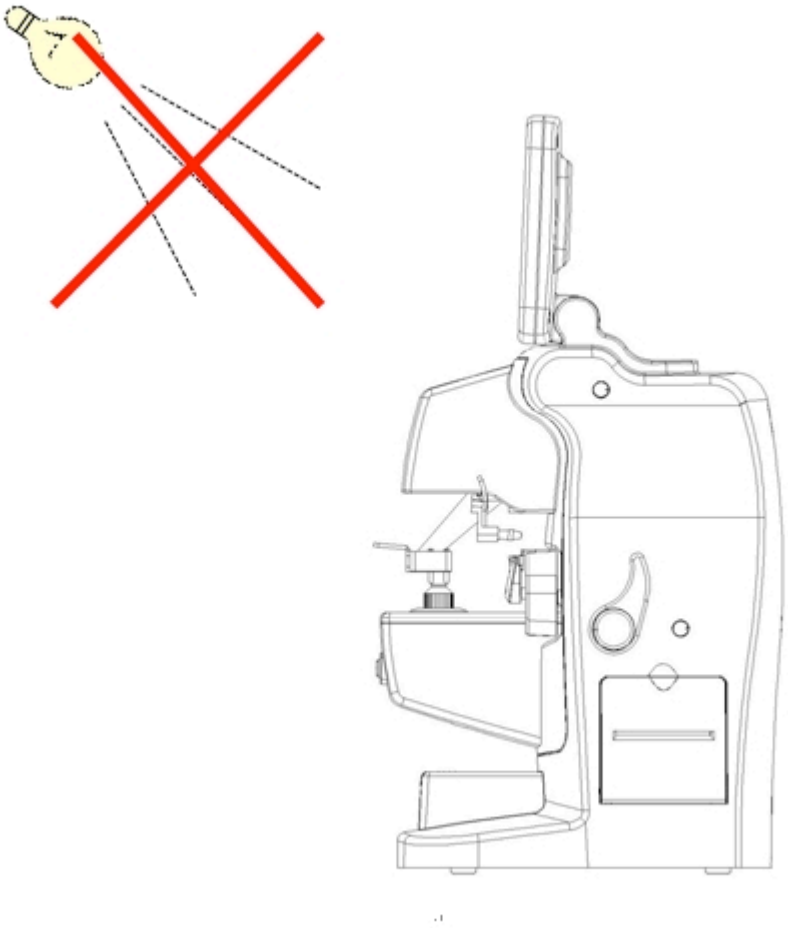
- Temperature : +10℃ ~ +40℃
- Humidity : 30% ~ 90% RH
- Atmospheric pressure range : 700 hPa ~ 1060 hPa

● Storage and Transportion environment :

- Temperature : -40℃ ~ +70℃
- Humidity : 10% ~ 95% RH
- Atmospheric pressure range : 500 hPa ~ 1060 hPa

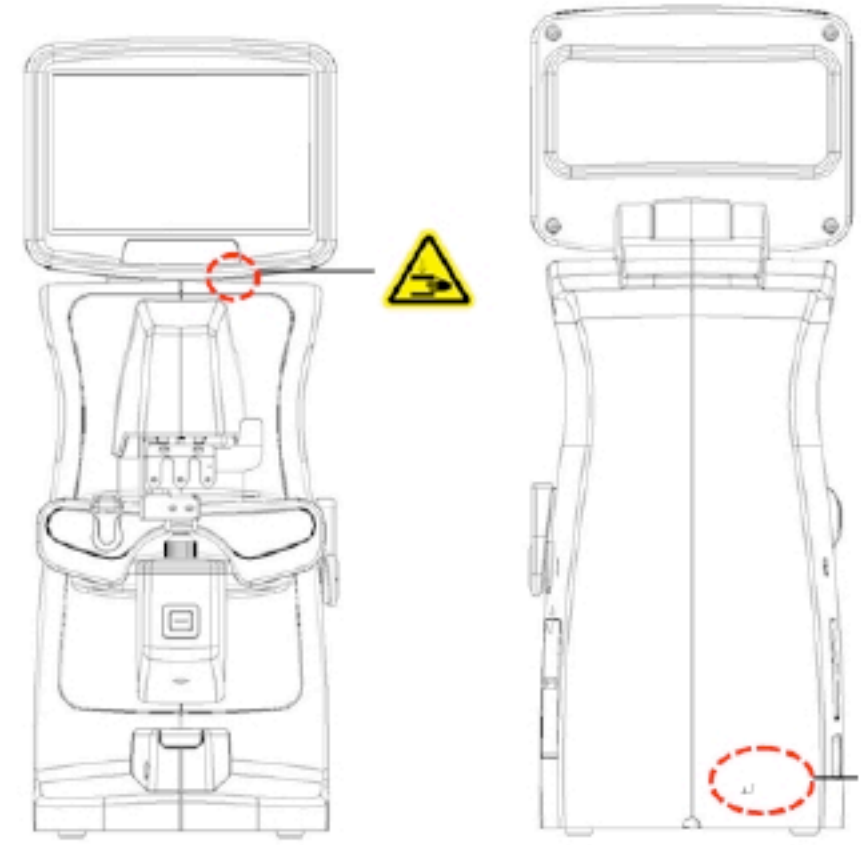
2.6 Environment of installing the device

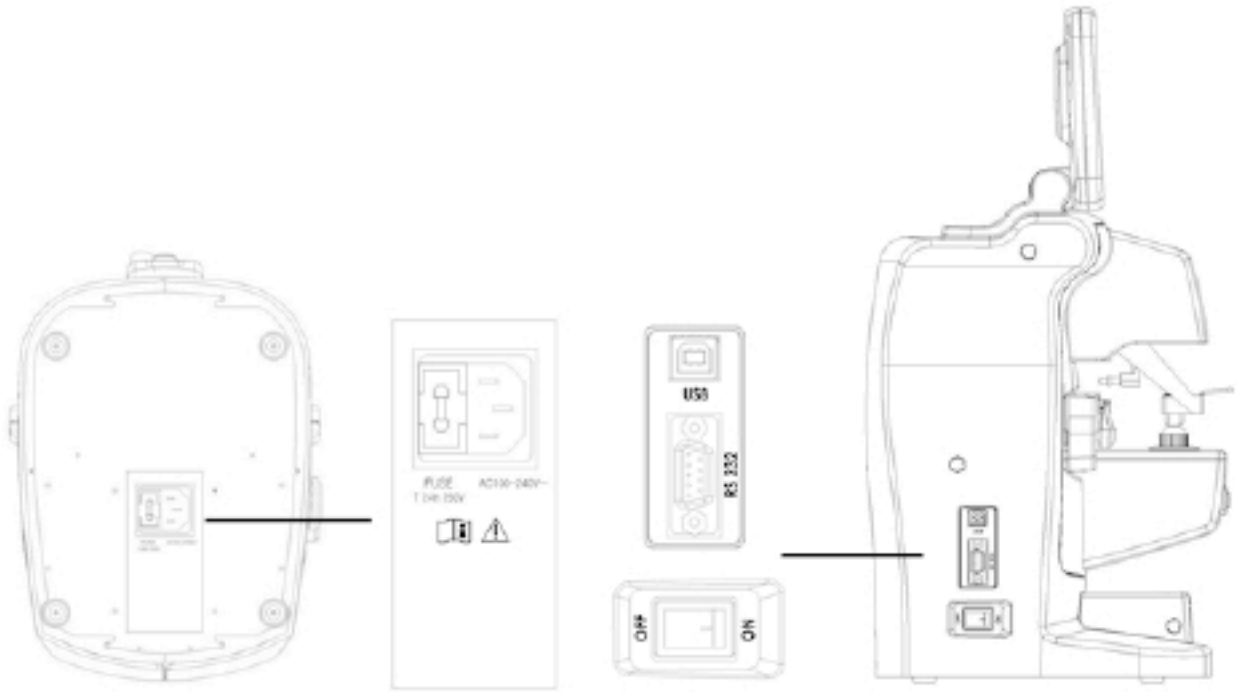
	Avoid installing the device on a place where it is exposed to direct sunlight or near the illumination. Exposure to the direct sunlight or too bright indoor lights may influence on the result of accurate measurment.



2.7 Labels

The following labels and indications are affixed to draw the operator's attention




USB
RS 232
OFF
ON

3. Features

- Various Measurments Supported
  Not only the usual refractometry and keratometry, but also corneal diameter and base curve of contact lens can be measured with this one instrument. Thus, measurments of eye and prescriptions for glasses and contact lenses can be made more efficiently.

- Wide Dioptric Measurment Range
  Because the ELM-9000 covers a wide measurment range, from -25D to +22D, even an examinee with strong myopia can be measured.

- More accurate Measurment
  The fogging method of the eye fixation target makes examinee's eye comfortable and enables to get more accurate measurment data

- Simple and convenient user's environment
  Deliver more convenient user environment with wide viewed 7.0" TFT COLOR LCD screen and with simple and intimate design.

- Developed illumination
  This function is able to observe eye condition of the cataract or contact lens surface. It is able to save 2 images of each eye and continuous observation.

- Easy Connection with other Equipment
  This instrument is designed to connect other Equipment such as LCD monitor.

4. Notes for Using the Instrument

1. To avoid the risk of electric shock, this equipment as power protective earth connection must be connected.
2. Do not hit or drop the instrument. The impact may cause damage to the function of this instrument. Please handle with care.
3. Only operate the instrument with the power supply indicated on the rating plate. Otherwise, it may result in fire or electric shock.
4. Never disassemble or modify. This can cause fire or electric shock.
5. In case there is smoke, strange odor or noise during operation, disconnect the power supply and consult the distributor.
6. For replacement parts (battery, fuse, or other parts), please contact the distributor from whom you purchased the product.
7. The external connection device is used UL certificate device and the specified power code, paper and fuse are used.

1. A sudden heating of the room in cold areas will cause condensation on the protective glass in the monitor screen and on optical parts inside the instrument. In this case, just wait until condensation disappears before performing measurment.
2. If you leave ELM-9000 without using for certain period, disconnect the power supply and protect the unit with dust cover.
3. When moving this ELM-9000, always keep power off, and then lift the bottom of the unit with both hands.
4. When moving and connect other device this ELM-9000, keep in touch with qualified technician or service agent and place the equipment plain.

1. Don’t use organic solvents such as alcohol, thinner, benzene, etc. to clean the surface of this instrument. It may damage the instrument.
2. Do not store alcohol, thinner and other flammable vapors and liquids in the vicinity of this equipment.
3. Do not use outdoors. The instrument is designed to be used only indoors.
4. Do not use Humidity or dusty environment
5. Never disassemble or modify this instrument because it may result in fire or electric shock. Also, since this instrument incorporates high-voltage parts and other hazardous parts, touching them may cause death or serious injury.
6. Keep it away from other persons but qualified technician.

	7. Be sure to turn OFF the power switch before connecting or disconnecting the cables. Also, do not handle them with wet hands. Otherwise, you may get an electric shock that may result in death or serious injury. 8. If you leave this instrument without using for certain period, disconnect the power supply 9. This equipment may be able to be operated improper by micro waves from cellular phones, walkie-talkie, remote controlled electric toys. Keep it away.

At the time of publishing the information in this book carefully identified and has been judged to be correct. However, there are mistakes and omissions that the US OPHTHALMIC, the use of the information contained in this book is not responsible for the results that occurred.

5. Prerequisites for safety

5.1 Preparation before use

-. Do not operate under direct sunlight or too strong lights
-. Do not store alcohol, thinner and other flammable vapors and liquids in the vicinity of this equipment.
-. Check printing papers are ready
-. Check chin rest is working properly
-. Remove dusts, especially on the lens.

5.2 Preparation when you use

-. Place this equipment plain
-. Clean the protective glass under the nosepiece every once in while with a blower
-. Do not put others on this equipment
-. Do not disassemble or modify on your own
-. Stand 40 minutes and get it worked if it is stored at extended temperate place
-. Keep it away from other persons but qualified technician.
-. Be sure to unplug if do not use long.
-. Do not turn off the instrument before finishing initialization.
(Don't power off during loading)

5.3 Instruction and operation sequence

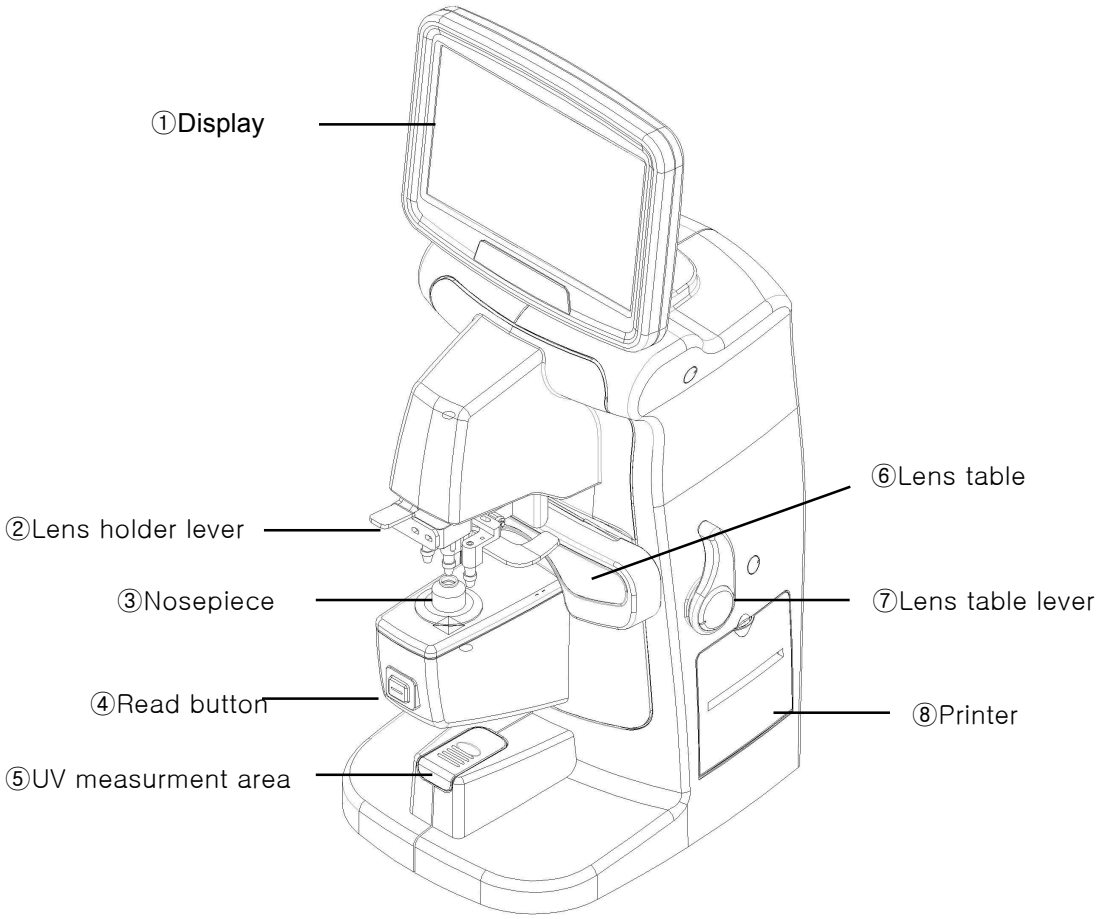
-. Please connect the power plug.
-. Press "ON"
-. Press buttons what you want
-. Refer to operation manual of 7 and 9 chapter

5.4 Storage after use

-. If the device will not be used for a long time, disconnect the power cord from the wall oulet
-. Clean with soft cloth, soaped and rinse, wipe dry
-. Wipe lens and glass' dusts out with wind blower and with soft cloth.
-. Fix by turning the fixation knob and keep it plain when you are about to move or lift up
-. Do store at the following place
    ① Not humid place
    ② Not in the vicinity of water
    ③ Not dusty and not in the vicinity of filthy place with salt or sulphur
    ④ Plain place
    ⑤ Not in the vicinity of vibration or shock
    ⑥ Not in the vicinity of other flammables vapors or liquids
    ⑦ Not in the vicinity of direct sunlight
-. Store the accessories and cords for next operation.

6. Configuration

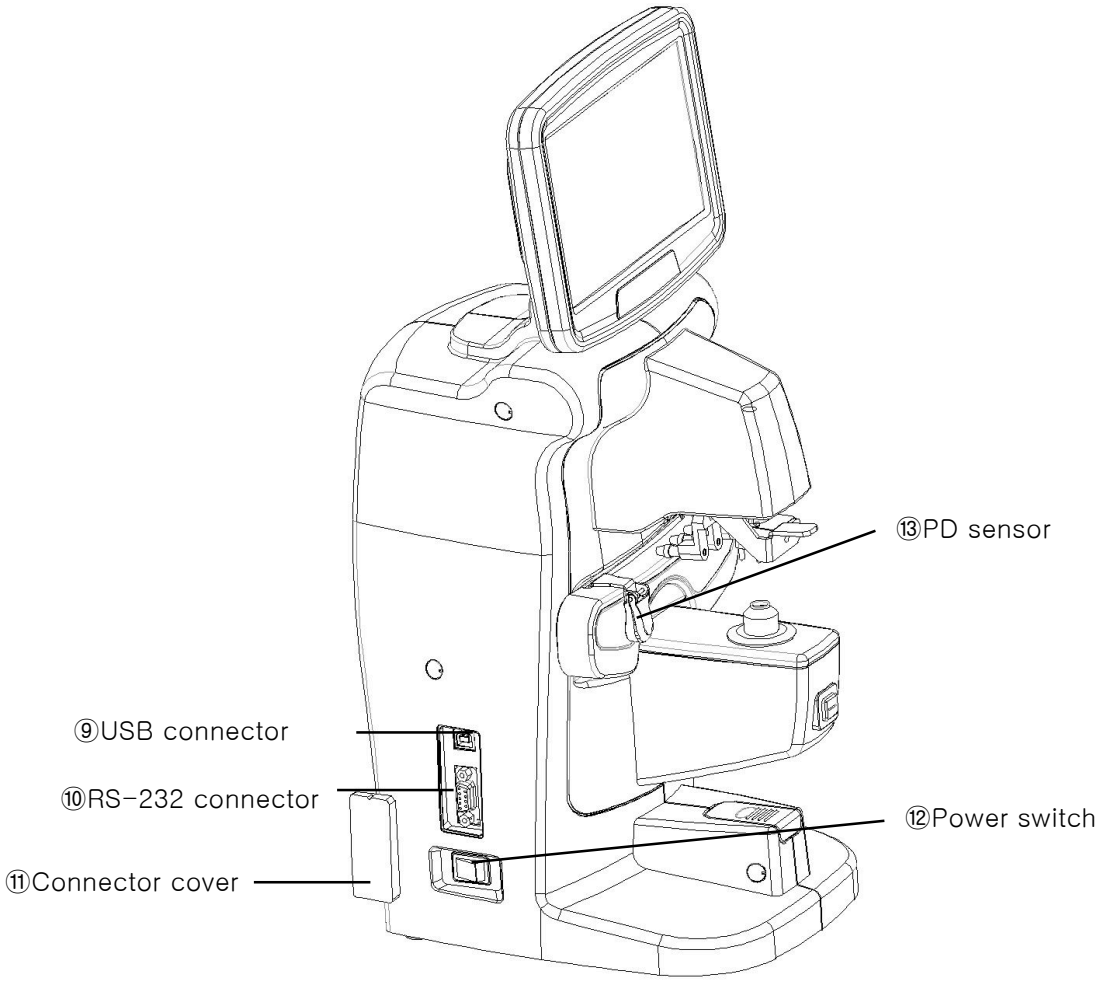
6.1 Front and right side



[Fig. 6-1] Front and right side

Name	Functions
①Display(touch screen)	7.0 inch TFT COLOR LCD Monitor, Touch
②Lens holder lever	Lever to fix lens
③Nosepiece	Prop to put lens
④Read button	Used to read measured data
⑤UV measurment area	Area to measure UV penetration ratio
⑥Lens table	PD can be measured
⑦ Lens table lever	Used to move the lens table back and forth
⑧Printer	Printer

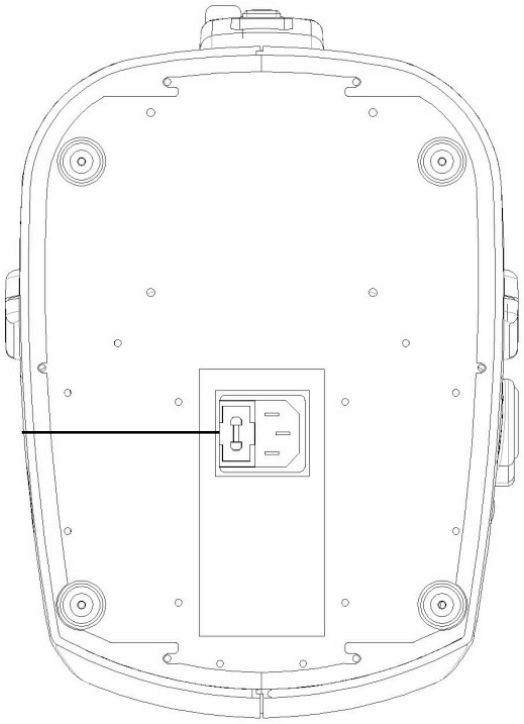
6.2 Left side



[Fig. 6-2] Left side

Name	Function
⑨ USB connector	Used to connect a computer
⑩ RS-232 connector	Used to connect a computer
⑪ Connector cover	Cover to protect a dust or foreign substance
⑫ Power switch	Used to turn on or off the power to the device
⑬ PD sensor	Sensor to measure PD

6.3 Bottom



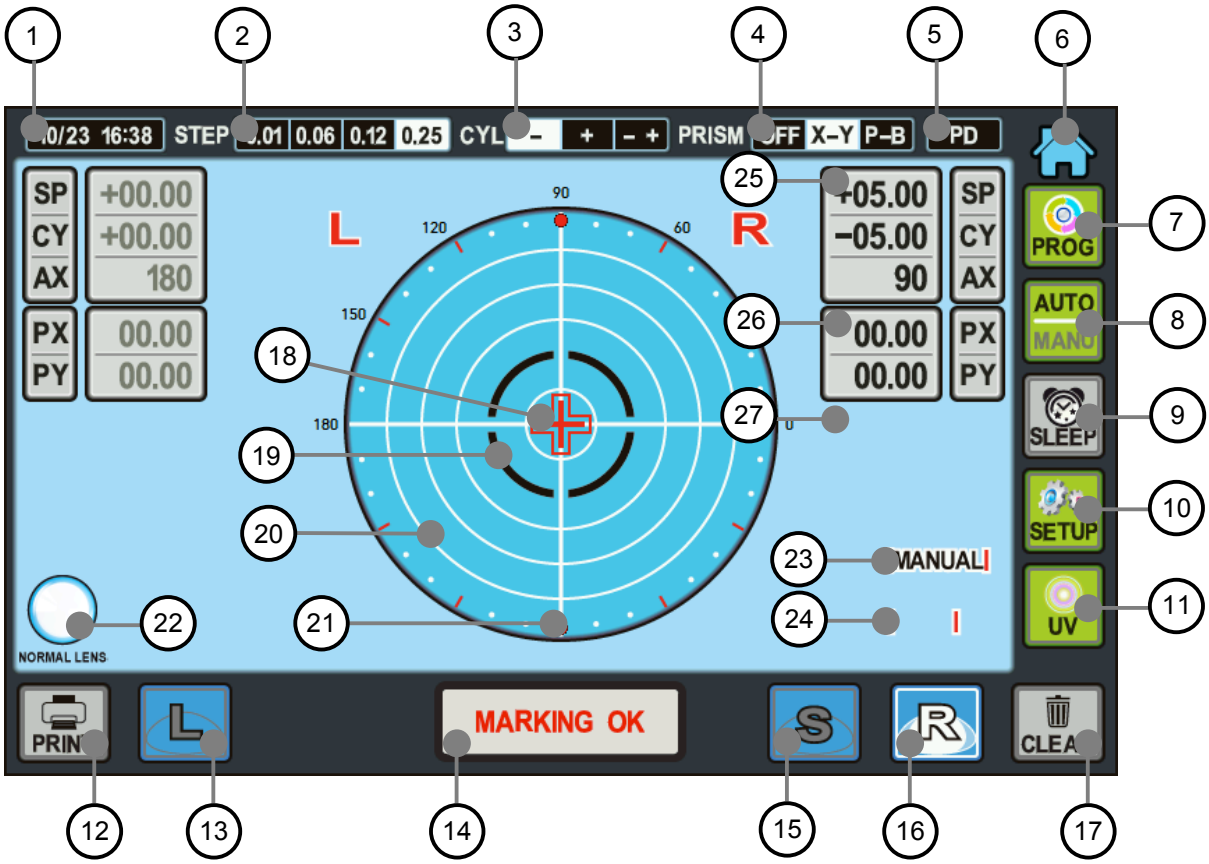
[Fig. 6-3] Bottom

Name	Function
① Inlet	Used to connect a power cord

6.4 GUI (Graphic User Interface)/Displays

To be composed intuitive so that the user can do what they want faster and conveniently

6.4.1 Normal measurment mode



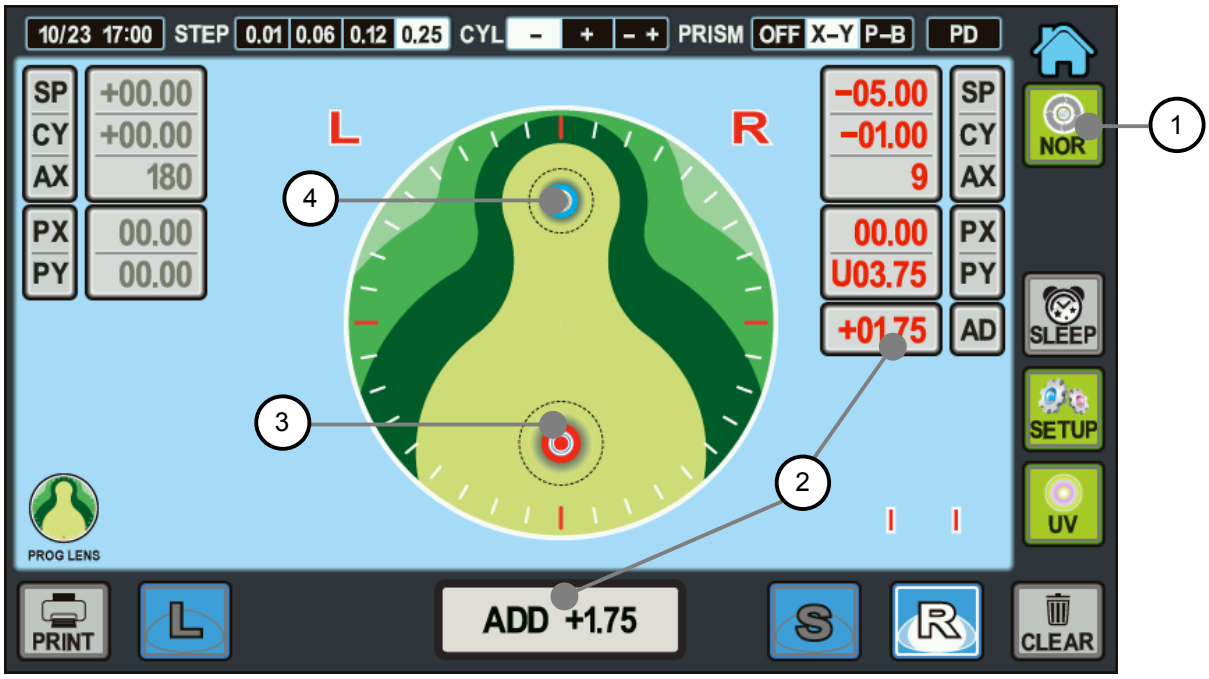
[Fig. 6-4] Normal measurment Screen

Name	Function
(1) Date/Time	Shows date and time
(2) Indication step	0.01, 0.06, 0.12 or 0.25 (D)
(3) CYL mode	+/-(MIX), + or -
(4) Prism mode	OFF, X-Y or P-B
(5) PD	Shows PD value
(6) HOME button	Carry out MENU mode
(7) Progressive mode button	Carry out Progressive measurment mode

(8) Auto read	Alter measurment mode from Auto to Manual or from manual to Auto.
(9) Sleep mode button	Carry out or end a sleep mode
(10) SETUP mode button	Carry out SETUP mode
(11) UV mode button	Carry UV measurment mode
(12) Print button	Used to print out the fixed data
(13) L indication	Select the left-eye lens
(14) Measurment button / information window	Carry out measurment and show the information happens during operation
(15) Single lens button	Select single lens
(16) R indicaion	Select the right-eye lens
(17) Initializing button	Erase all the data and arrenge new measurment
(18) Prism position	Show the position of lens to be measured
(19) Alignment condition	When approach to the center of lens, the line changes into the thick and black line
(20) Prism concentric circle	Each concentric circle means 0.5, 1.0, 2.0, 3.0, 4.0 and 5.0 (Prism).
(21) Axis mark	Show axis
(22) Info window	Express the information of lens to be measured now.
(23) Auto / Manual	Show the measurment mode; Auto or Maual
(24) AUTO-RL indication	Show the condition of AUTO-RL
(25) SPH POWER	. ● SP : Sphere power ● CY : Cylinder power ● AX : Astigmatism axis
(26) Prism power	● PX & PY : Horizontal prosm and Vertical prism ● PR & PB : Absolute prism and prism angle
(27) Addition power	● A1 : Bifocal addition ● A2 : Trifocal addition

[Fig. 6-5] Measurment screen

6.4.2 Progressive Power Lens(PPL) measurment screen



[Fig. 6-6] Progressive Power Lens(PPL) measurment screen

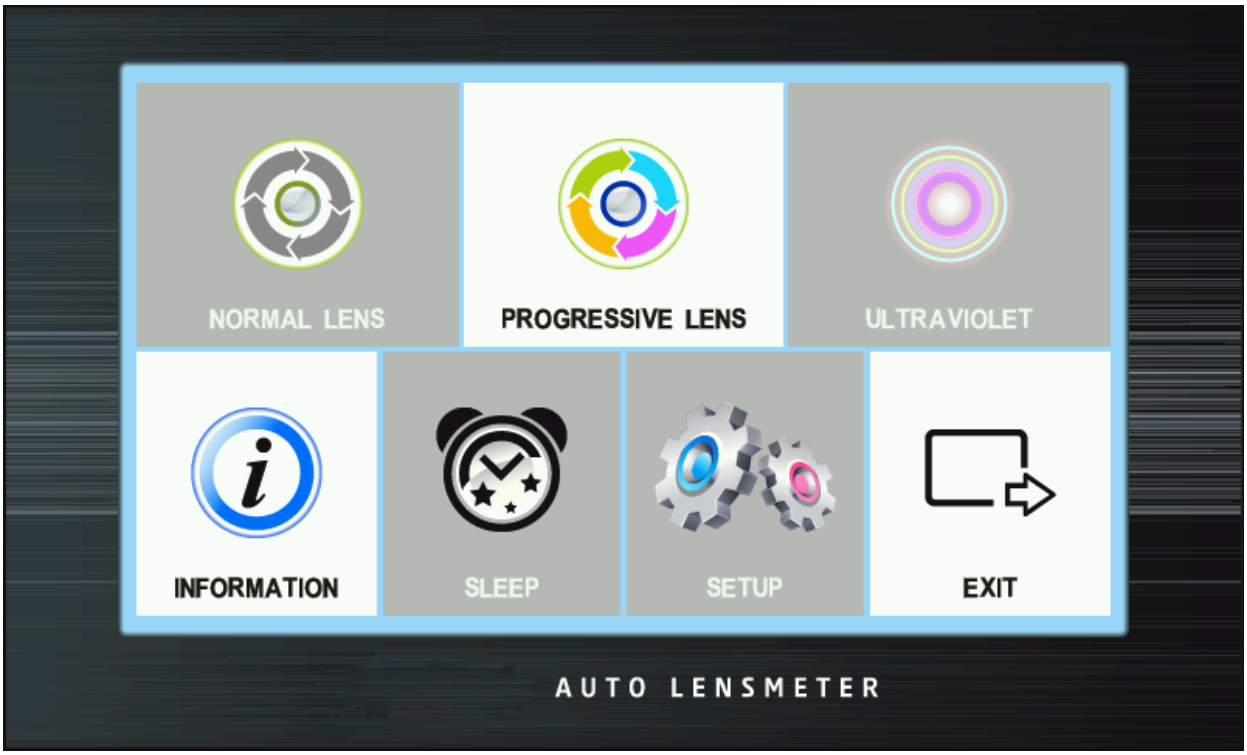
Name	Function
(1) Normal mode button	Carry out the normal measurment mode
(2) Addition value	Shows progressive addition
(3) Measurment position of far part	Shows the position of far part
(4) Target of near part	Shows the position of near part

[Fig. 6-7] Function of progressive Power Lens(PPL) measurment screen

6.4.3 MENU mode

A various functions are in MENU mode so that user can select and use what they want to operate

Press [HOME] button to carry out menu mode



[Fig. 6-8] MENU mode screen

[NORMAL LENS] button
Carry out the normal measurment mode

[PROGRESSIVE LENS] button
Carry out the pregressive measurment mode.

[ULTRA VIOLET] button
Carry out UV measurment mode.. (Applied olny in the model to serve UV measuremet)

[INFORMATION] button
Shows a important information related with a prodcut
Touch information window to go back to the previoius sreen.

[Fig. 6-9] Product Information screen

[SLEEP] button

Carry our sleep mode. To end sleep mode, just touch the screen or press a button.
Even it's set up as off in System page , can come to sleep mode pressing this button

[SETUP] button

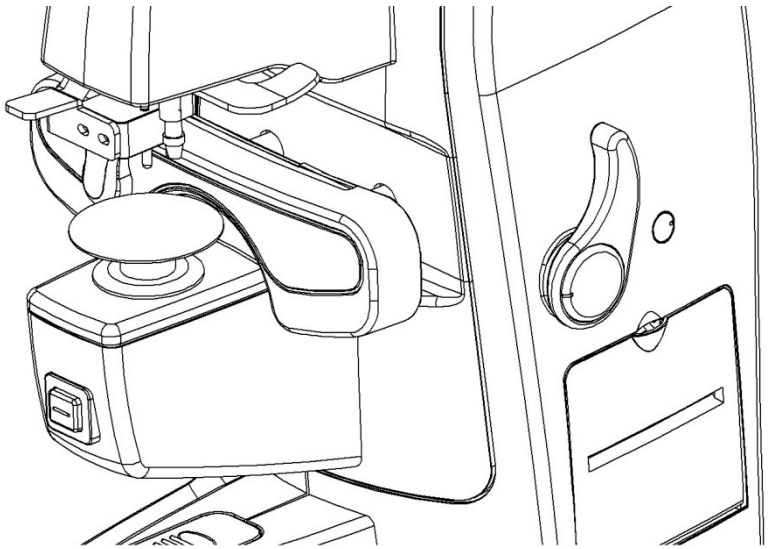
Carry out SETUP mode

[EXIT] button

Go back to the previous mode.

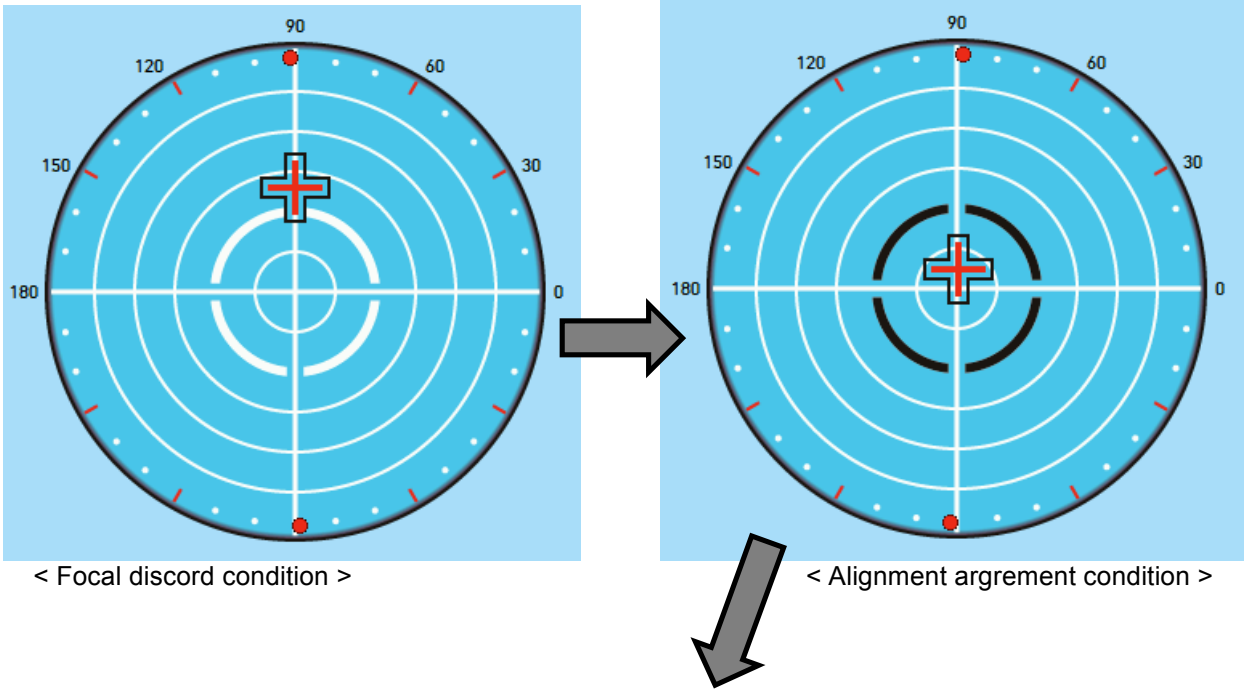
7. Measurement

7.1 Normal lenses measurment



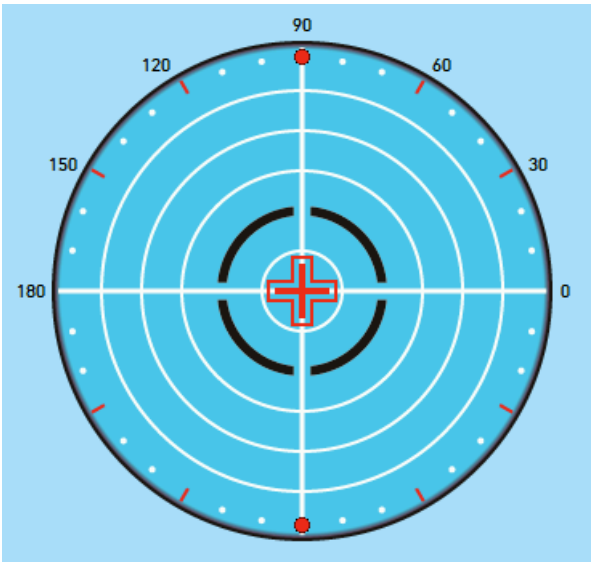
[Fig. 7-1] Measurment method for a normal lens before proess

1) Turn on after checking if there is no lens on nosepiece
2) Press [CLEAR] button to initialize measurment condition
3) Put the lens on nosepiece, fix the lens pulling the lens holder lever and then press [S] button
4)Move lens with care so that prism cursor may go to the center of concentric circle. If alignment is ok, “ALIGNMENT OK” shows on information window and if focus is matched up, “MARKING OK” shows on information window



< Focal discord condition >

< Alignment argrement condition >

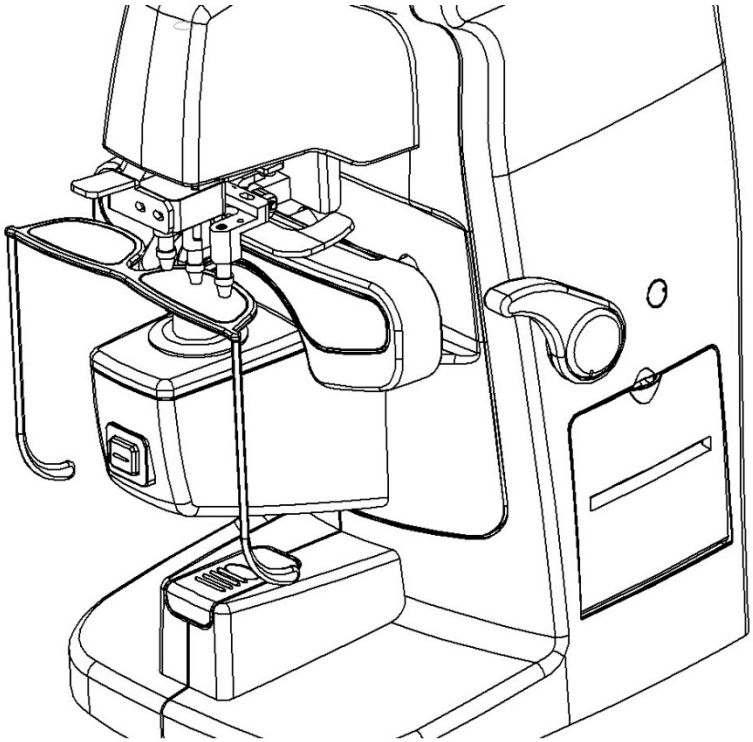


< Focus agreement condition >

[Fig. 7-2] Focus adjustment sequence

5) In case of lens with cylinder porer, rotate lens to fit 180 degree
but in case of lens without cylinder power or in case don't need to mark CYL, don't need to fit 180 degree
6) Press read button to save measurment data. In case of auto measurment mode, the measurment data is saved automatically when "MARKING OK" continue for the predetermined time. After saving, the measurment data change it's color from black into red.
7) Press PRINT button to transmit a measurment data to the external device and print out the data.

7.2 Glasses lenses measurment



[Fig. 7-3] Measurment method for the processed glasses lenses

1) Turn on after checking if there is no glasses on nosepiece.
2) Press [CLEAR] button to initialize measurment condition.
3) Put the glasses on nosepiece, fix the glasses pulling the lens holder lever and then press [R] button. (In case PD measurement is possible, PD position sensor is automatically recognized and fixed for L/R of glasses lens.)
4) Move glasses lens so that prism cursor may go to the center of concentric circle. In case glasses lens is moved on nosepiece, move slowly and softly to be not faulty.
5) Press read button to save measurment data. In case of auto measurment mode, the measurment data is saved automatically when “MARKING OK” continue for the predetermined time. After saving, the measurment data change it’s color from black into red.
6) Press [L] button to fix measurement lens to Left lens.
7) Measure going through 4), 5) steps.
6) Press [PRINT] button to transmit a measurment data to the external device and print out the data.

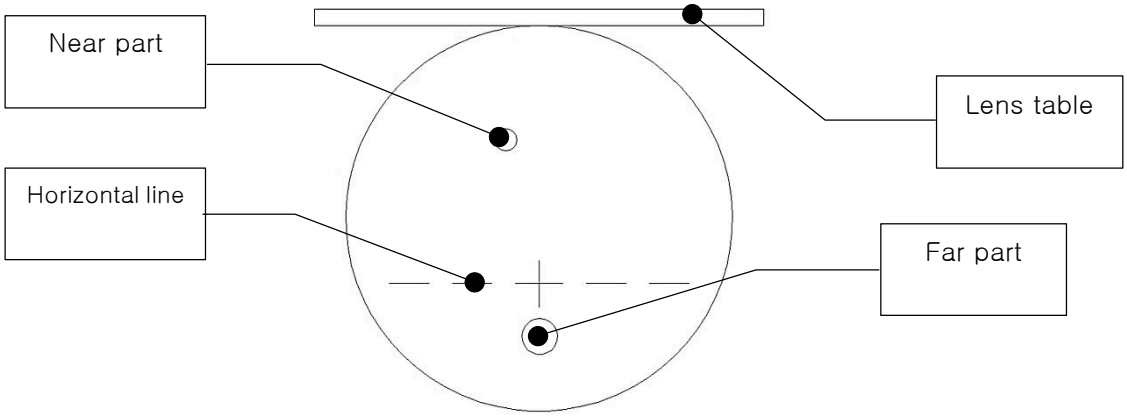
7.3 Measurement of Multifocal lens

1) Measure following way of normal lens or glasses lens measurement on 7.1 or 7.2 phrase.
2) Do not move lens and then press read button. AD1 and AD2 of Addition power is added.
3) Position lens on Bifocal addition and then press read button to save measurement value of AD1. After saving, the measurment data changes from black into red.
4) In case of Bifocal addition, press [PRINT] button to transmit a measurment data to the external device and print out the data.
5) Position lens on Trifocal addition and then press read button to save measurement value of AD2. After saving, the measurment data changes from black into red.
6) Press [PRINT] button to transmit a measurment data to the external device and print out the data.

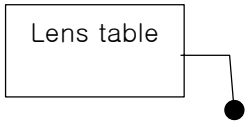
7.4 Measurement of Progressive lens

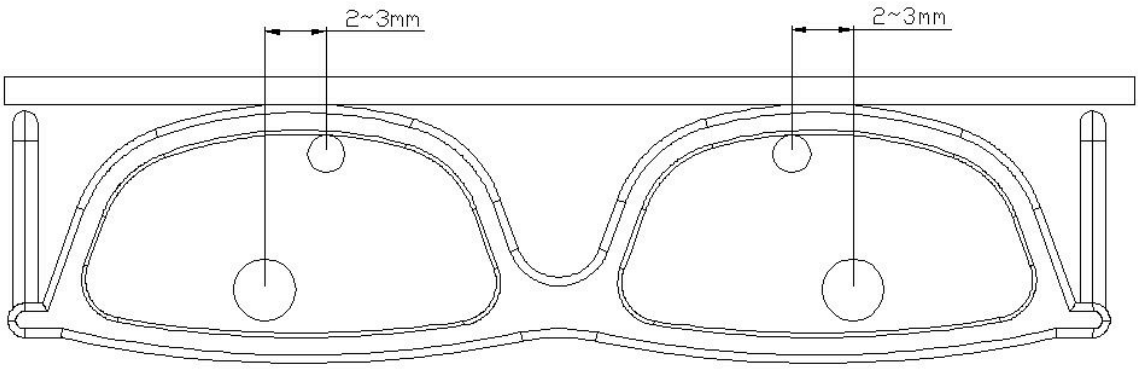
7.4.1 Measurement preparation

1) Turn on after checking if there is no lens on nosepiece.
2) Position near part near by lens table and put in parallel between horizontal line of lens and lens table on nosepiece.



[Fig. 7-4] Method how to put progressive lens on nosepiece before process



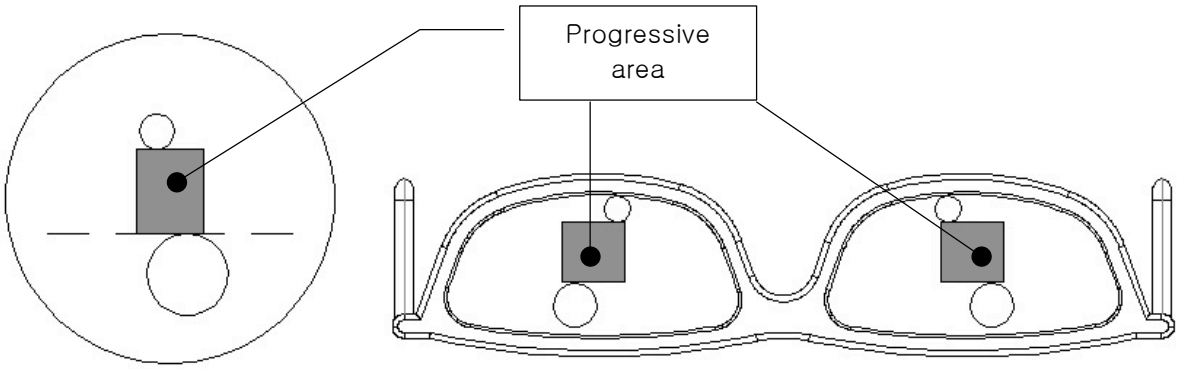


[Fig. 7-5] Method how to put progressive lens on nosepiece after process

3) Fix the lens pulling the lens holder lever and position using lens table so that center of lens is on nosepiece.
4) Press [CLEAR] button to initialize measurment condition.

7.4.2 Carrying out progressive mode

1) There are two ways to carry out progressive mode. First, press [PROG] button to carry out progressive mode immediately. Secondly, move lens front, rare, left and right slowly to carry out progressive mode. In order to use automatic function for progressive lens, 'PROG RUN' value of SEETUP mode must be 'AUTO'.



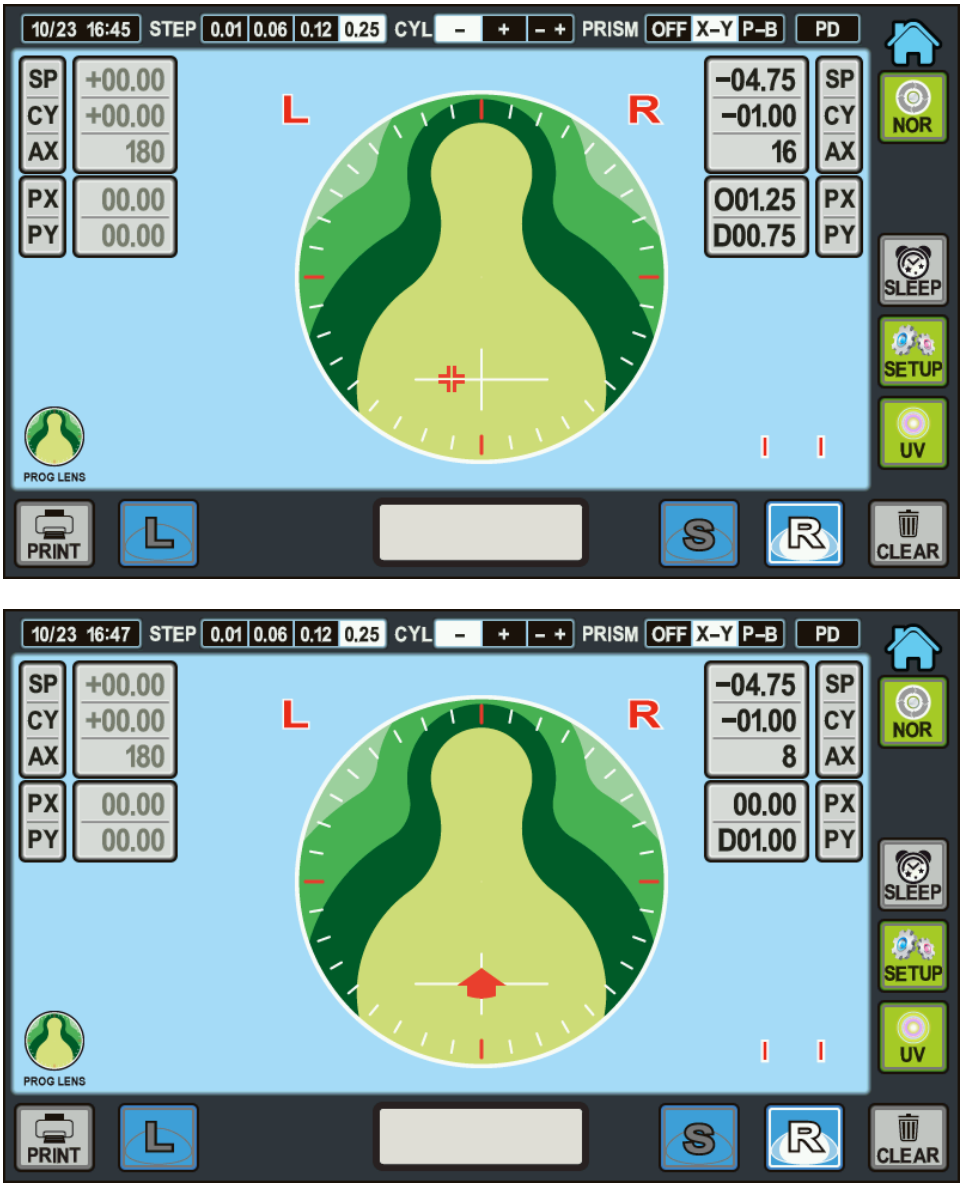
[Fig. 7-6] Progressive area of progressive lens

2) After carrying out progressive mode, there is target of far part at the bottom of screen center.

7.4.3 Measurement of far part

When lens is moved, be careful so that lens is not lifted and maintained fixed angle to have correct measurement value.

1) So that lens is in far part area, move lens horizontally to be in tune with horizontal center.
2) Move lens vertically to far part area. If lens is out of horizontal center when move, carry out step 1) again.

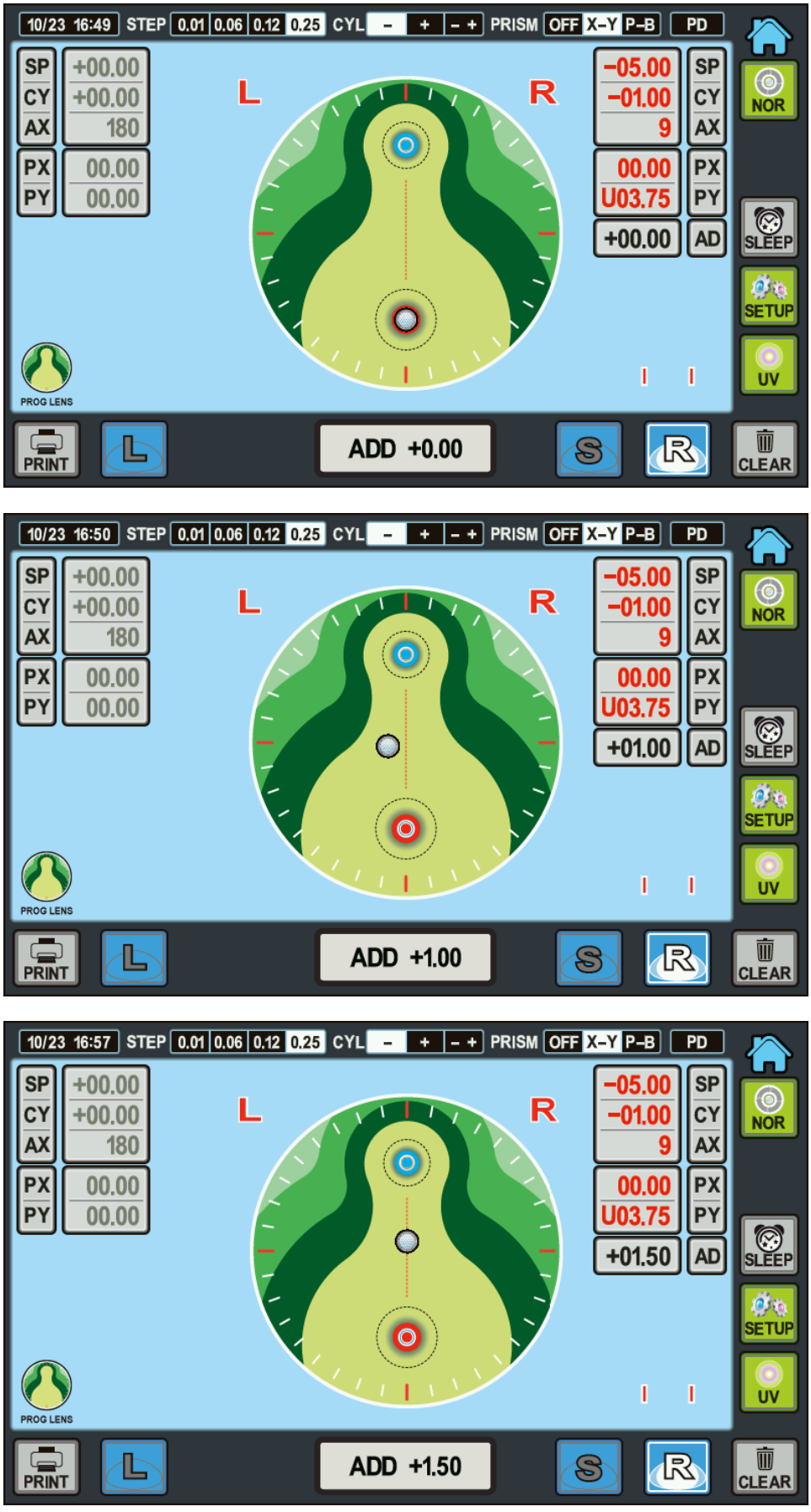


[Fig. 7-7] Measurement of far part

3) If indicator is reached to the center of far part target, value is automatically saved with sound and automatically move to near part measurement. If progressive area is extended to far part, press read buttion to manually carry out far part measurement.

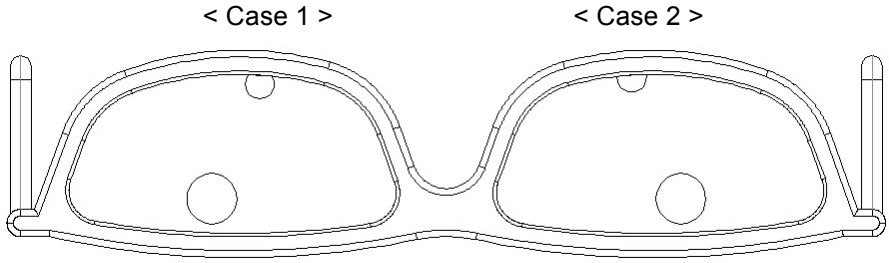
7.4.4 Measurement of near part

1) Move lens to reach to near part target. When lens is moved, be careful so that lens is not lifted and maintained fixed angle to have correct measurement value. If lens is out of standard line, move lens vertically to be in tune with horizontal center.



[Fig. 7-8] Measurement of near part

2) If indicator is reached to the center of near part target, value is automatically saved with sound and near part measurement is finished. After near part measurement, ADD value is changed from black into red. In case measurement is difficult like Case 1 and 2, horizontality must be fixed well and press read button to make near part by force. In that case, addition value may be different with real value.



[Fig. 7-9] Feature of small frame lens

3) Press [PRINT] button to transmit a measurment data to the external device and print out the data.

7.5 Measurement of hard contact lens

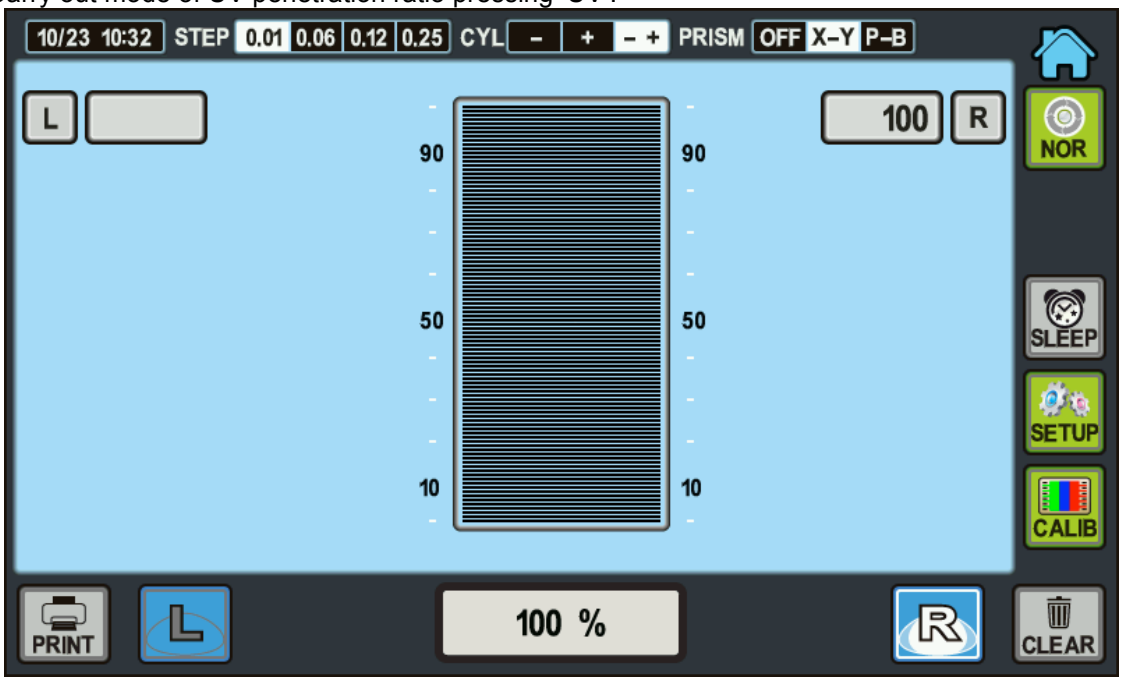
1) Choose ‘HARD CL’ on ‘LENS TYPE’ of SETUP mode.
2) Change from lens prop to contact lens prop.
3) Dry lens clearly and put convex part of lens right side up.
4) Fix focal point moving lens.
5) Save measurement value pressing read button.
6) Press [PRINT] button to transmit a measurment data to the external device and print out the data.

7.6 Measurement of soft contact lens

1) Choose ‘SOFT CL’ on ‘LENS TYPE’ of SETUP mode.
2) Change from lens prop to contact lens prop.
3) In case soft contact lens is easily tore, Dry lens with a towel clearly.
4) put convex part of lens right side up.
5) Fix focal point moving lens.
6) Save measurement value pressing read button.
7) Press [PRINT] button to transmit a measurment data to the external device and print out the data.

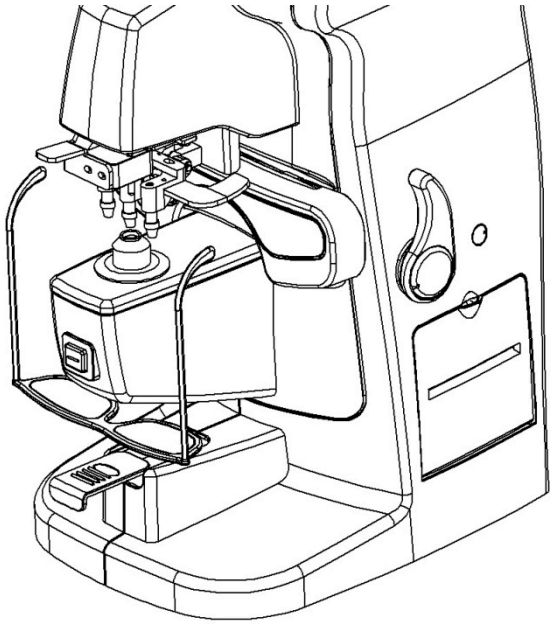
7.7 Measurement of UV penetration ratio

1) Carry out mode of UV penetration ratio pressing ‘UV’.



[Fig. 7-10] Screen of measurement for UV penetration ratio

2) Remove UV cover.
3) Revise penetration ratio as 100% pressing [CALIB] button.
4) Put lens on UV measurement part.



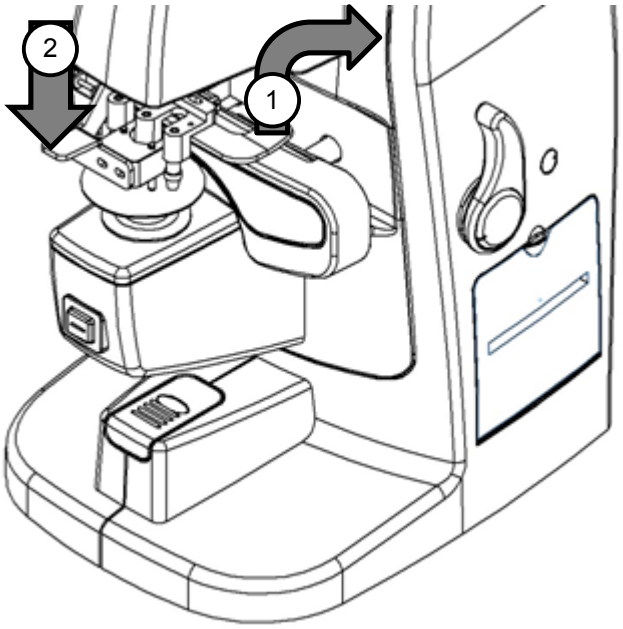
[Fig. 7-11] Method of measurement for UV penetration ratio

5) Save the penetration ratio pressing read button.
6) Press [PRINT] button to transmit a measurment data to the external device and print out the data.
7) Return prior mode pressing [NOR] or [PROG] button.

7.8 Marking

7.8.1 Lens without Astigmatism

1) After putting lens, set the lens to be 'MARKING OK'
2) On tilted lever(①), press down the marking lever(②) to mark the lens.



[Fig. 7-12] Method to make a dot

7.8.2 Lens with Astigmatism

1) After putting lens, set the lens to be 'MARKING OK'.
2) Set the lens to be prescription angle maintaining 'MARKING OK'.
3) Press down the marking lever to mark the lens.

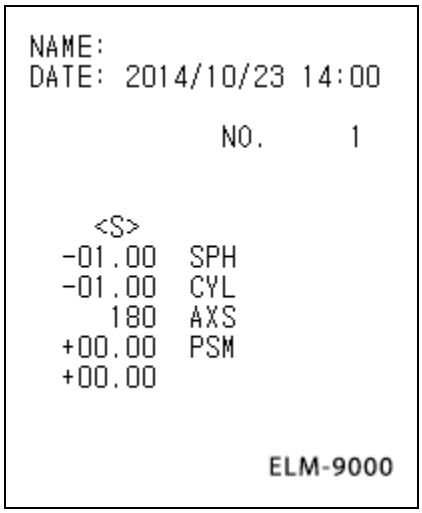
7.8.3 Prism lens

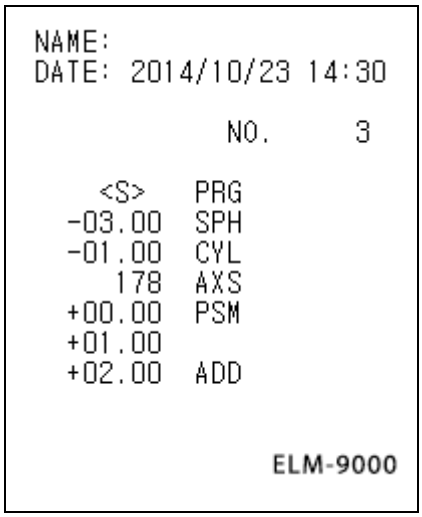
1) Change to prescribed prism.
2) Set the lens between prescribed prism value and the prism value of the screen concordantly.
3) Press down the marking lever to mark the lens.

7.9 Printing for measured data

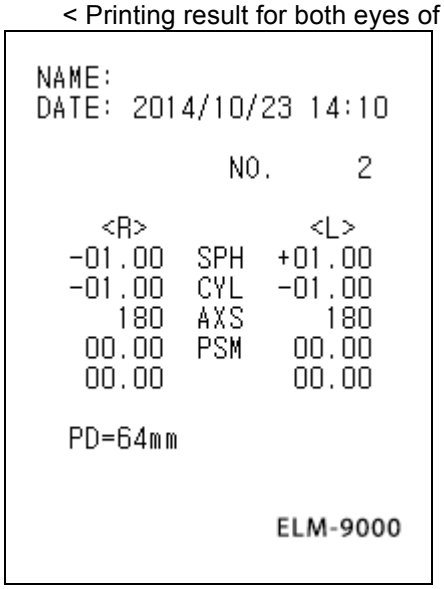
After measurement, Press [PRINT] button to print out the measured data.
If printing without measured data, it shows "NO MEASURE" on the screen.
Change to 'ON' for 'PRINTOUT' value of SETUP mode if it shows "PRINTOUT OFF" message.

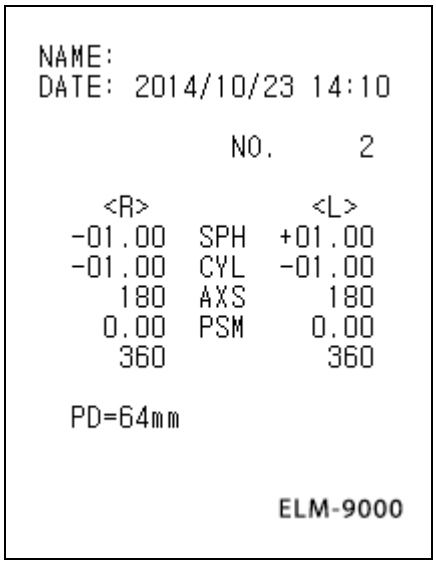
< Result of printout for single eye of normal lens and Progressive lens >





< Printing result for both eyes of X-Y Prism Form and P-B Prism Form >





[Fig. 7-13] Printing resut

8. SETUP MODE

Run setup mod after clicking [setup]button

Setup mode consist of Measure, system, date/time, print

Setup mode use below 3 common buttons

- EXIT(

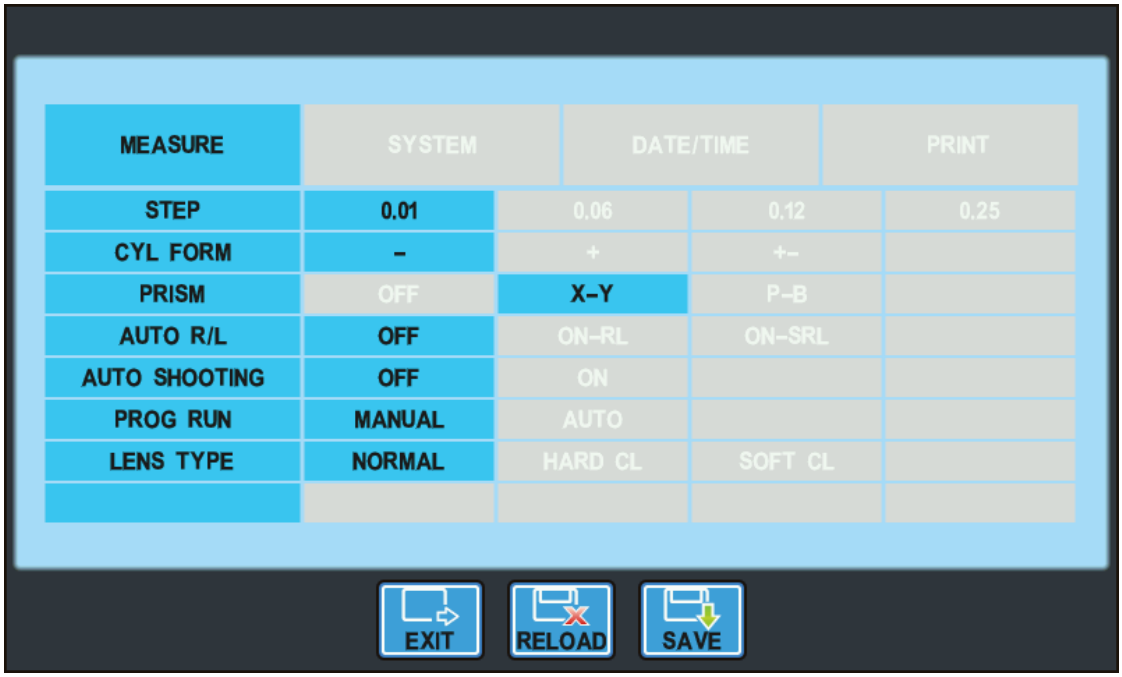
) : finish setup mode
- RELOAD(

) : Raod the last saved data
- SAVE(

) : save all of amended data. If you want to save amended data must click before finishing setup mode

8.1 MEASURE PAGE

Choose [MEASURE] button on the SETUP mode



[Fig. 8-1] MEASURE PAGE

1) STEP
Choose one unit among 0.01/0.06/0.12/0.25 for Spherical, Cylinder, Prism

2) CYL FORM
Choose one sign among -/+/+-

3) PRISM
Choose one among OFF/X-Y/P-B
(1) OFF : It's not display the prism information
(2) X-Y : It's disply the X-Y coordinate for the prism information
(3) P-B : It's display the prism value and axis for the prism information

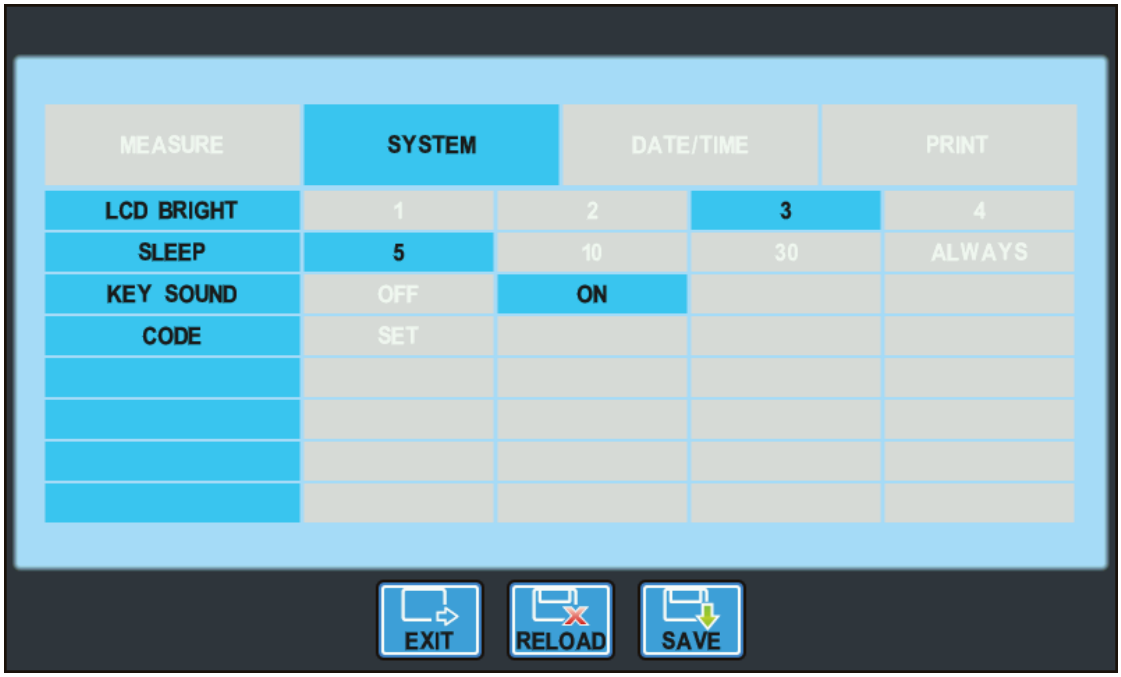
4) AUTO R/L
Choose one among OFF/ON-RL/ON-SRL to recognize the lens automatically

(1) OFF : it's not use AUTO R/L
(2) ON-RL : It's use AUTO R/L
(3) ON-SRL : It's use AUTO R/L, the initial value is single lens

5) AUTO SHOOTING
Choose one between OFF and ON for auto shooting
(1) OFF : It's not use auto shooting
(2) ON : It's use auto shooting

8.2 SYSTEM PAGE

Click [system] button on SETUP mode



[Fig. 8-2] SYSTEM PAGE

1) LCD BRIGHT
Possible to choose on among 1 / 2 / 3 / 4 for brightness

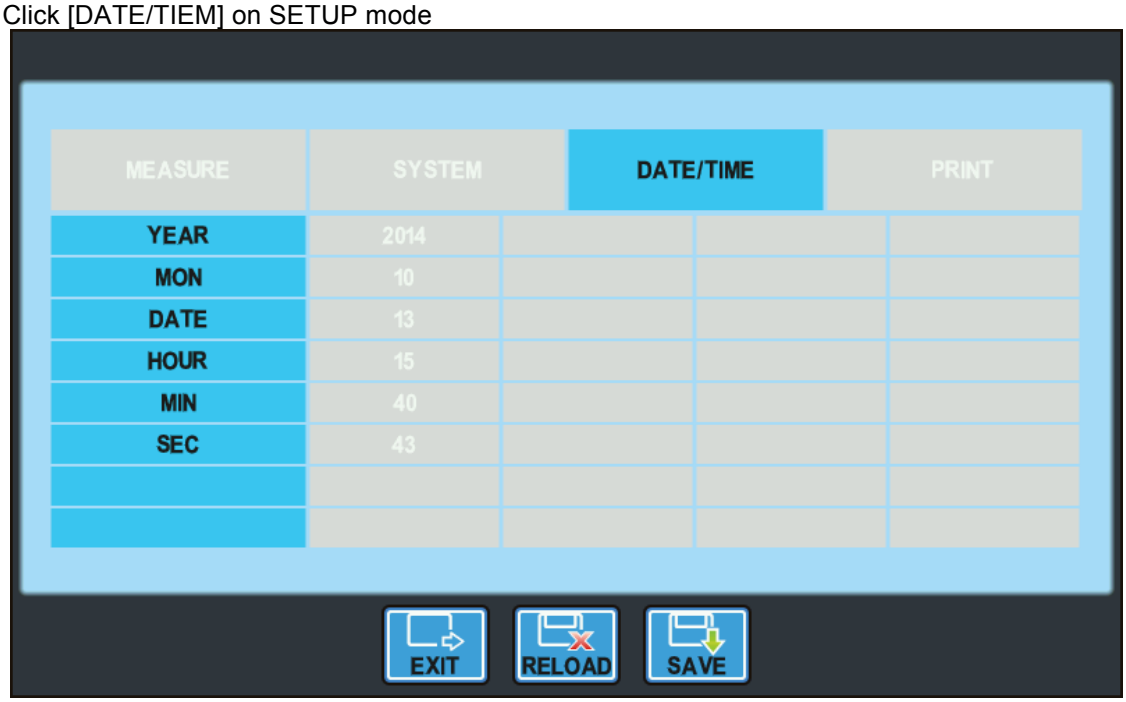
2) SLEEP
Possible to choose one among 5 / 10 / 30 / ALWAYS for saving electric power

3) KEY SOUND
Possible to choose between Off and On to use key sound

4) CODE
This is only for service man

8.3 DATE/TIME PAGE

Click [DATE/TIEM] on SETUP mode



[Fig. 8-3] DATE/TIME PAGE

1) YEAR
It's possible to amend year. Run DATE/TIME for amendment after clicking this year.

2) MON
It's possible to amend month, Run DATE/TIME for amendment after clicking this month

3) DATE
It's possible to amend date, Run DATE/TIME for amendment after clicking this date

4) HOUR
It's possible to amend hour, Run DATE/TIME for amendment after clicking this hour

5) MIN
It's possible to amend min, Run DATE/TIME for amendment after clicking this min

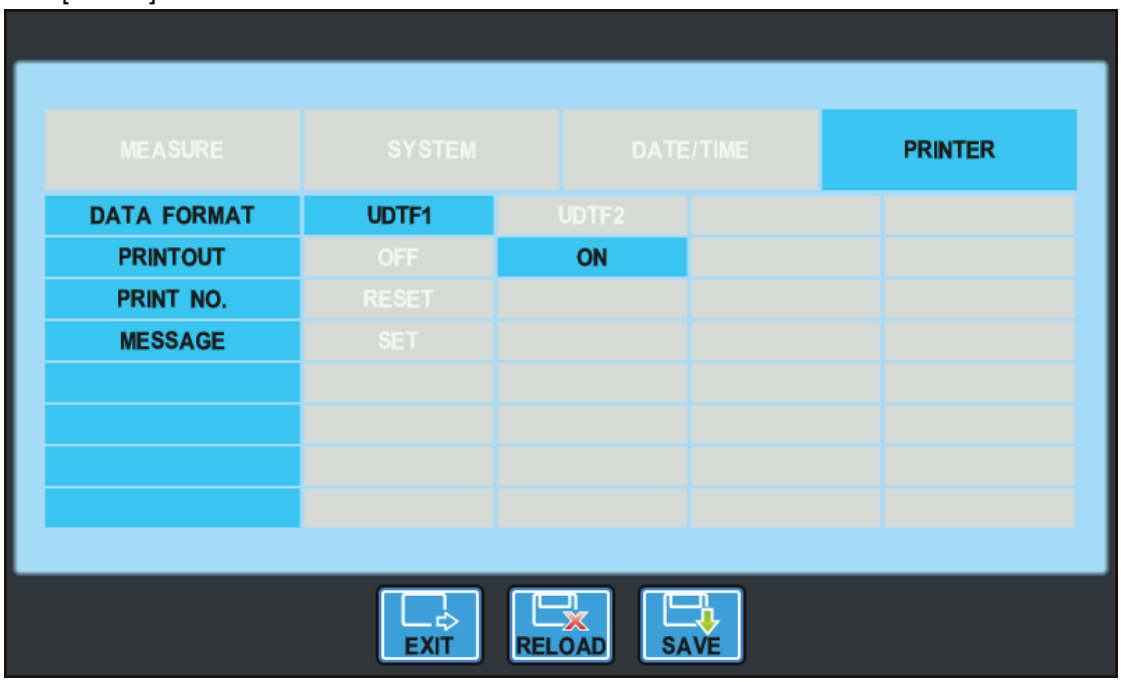
6) SEC
It's possible to amend sec, Run DATE/TIME for amendment after clicking this sec

7) Edit DATE/TIME
It's possible to amend year/month/date/hour/min/sec, It is displayed list for amending (year/mon/date/hour/min/sec)
Red color means amending number. Clicking it and input wanted number and save

[Fig. 8-4] EDIT DATE/TIME

8.4 PRINT PAGE

Click [PRINT]button on SETUP mode



[Fig. 8-5] PRINT PAGE

1) DATA FORMAT

Choose one between UDTF1 and UDTF2 that is data format. It's purpose to send measurement data to sed another instruments

2) PRINT OUT

Choose one between OFF/ON for printing of measurement value

3) PRINT NO.

Initialize print NO

4) MESSAGE

It's for print footer. If you run message window after clicking [set] you can writer footer. Red color means amending place. And click [save] for saving

[Fig. 8-6] EDIT MESSAGE

[input word]

Click a button to input a word

that will be added on the red coursor. And coursor moved right. The maximum number of word is 44. So if input 44 words will be made beep sound. And you can't input word anymore.

[delete word]

Click [←] and remove words

Save data

Click [Save] button to save edited footer

9. Self diagnosis and maintenance

9.1 check befor asking service to sales agent

It's displayed warning when happen matters or malfunction.
If then run below steps
However, can't solve matters contact to sales agent after switching off.

(1) displayed message when swich on

Message	Cause	step
Initialization ERROR	It's error for initialization	Remove dust on the measuring screen after remove the prob or rebooting after dislodging lens Contact sales agent if can't sove it and displayed the message again

(2) displayed message during running

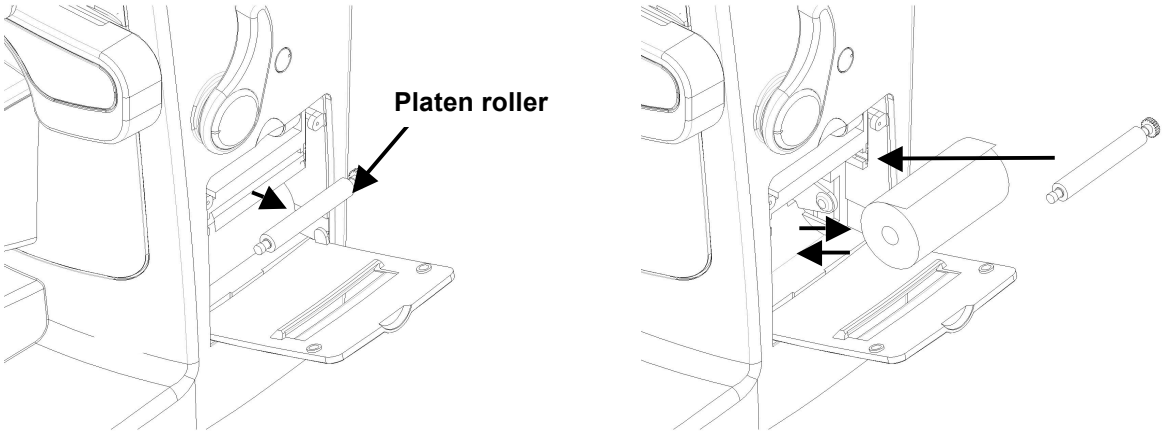
Message	Cause	step
ALIGNMENT OK	It's a good alignment	The center of lens adjusted in 0.5Δ
MARKING OK	It's a good focusing	The center of lens is correct
ERROR	It's impossible for measurement	Measure again after cleaning lens Remove dust on the measuring screen after removing the prop And remove dust by air.
OUT	It's over measurement value	It's overed measurmenet value
NOT SUPPORT	This is not supporting function	It's different among models for supporting range Check possibility of support for the lens

(3) displayed message during printing

message	cause	setp
NO MEASURE	There is no measured data	Reprint after measuring lens
PRINTOUT OFF	Can't print on the printer paper	It's selected "off" printeout menu of SETUP

9.2 printer paper replacement method

Displayed ren line on the printer paper it's time to replace printer paper



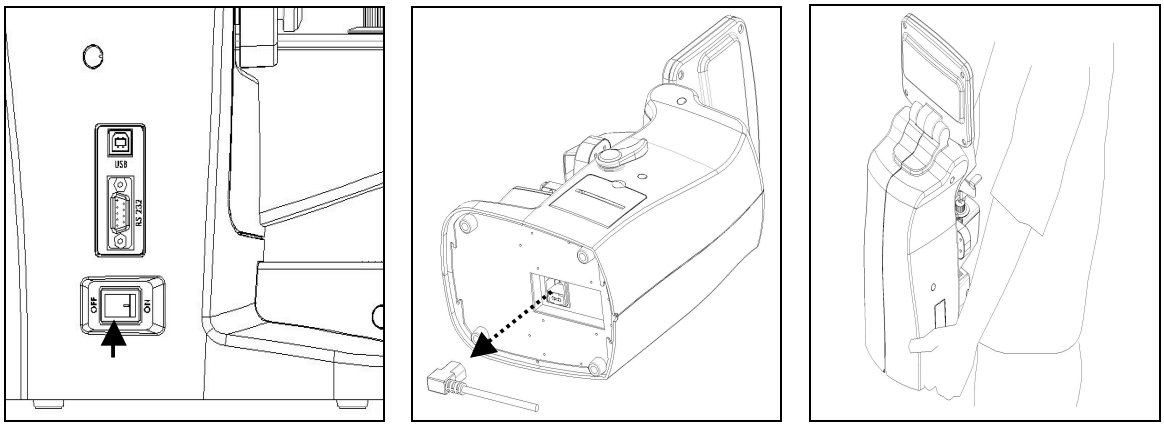
[Fig. 9-1] printer paper replacement

a. Opne printer cover and put out printer roller to remove remained printer paper
b. Fig 0-1 shows how to input printer paper so after installing printer paper fasten by platen roller
c. Close printer cover after putting the printer paper into ejection point

※ If the paper is not completely installed pul out printer paper

※ Checking specification of printer paper and must use suitable printer paper
(type: Thermal Paper, specification, width: 55mm, externam diameter: 30mm)

9.3 move another place



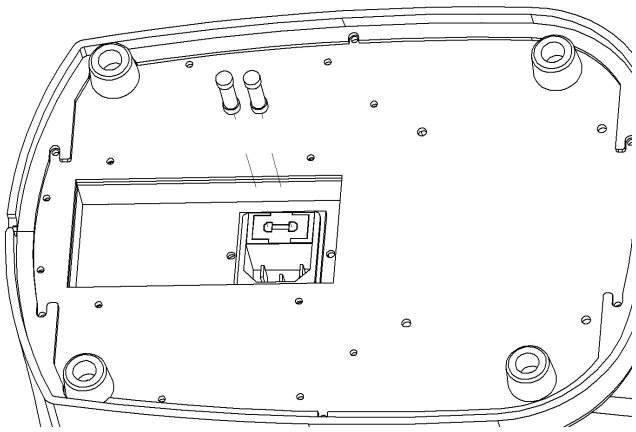
[Fig. 9-2] move another place

a. switch off
b. Pull out electrical cord
c. Grab bottom side and make horizontitly during moving another place

9.4 Fuse Replacement

The power protection fuse protects the product from excess current. If the power monitoring protection circuit detects excess current, it shut off the current to the equipment in order to prevent overheating and to restrict the SMPS power output.

	To avoid risk of electric shock, always disconnect the plug from the system prior to fuse replacement.



[Fig. 9-2] fuse replace method

1. Switch off and pull out electrical cord
2. Open fuse case and remove fuse holder
3. Remove the old fuse and put in the new fuse
4. Connect electrical cord after installing the new fuse

※ Fuse information is shown in the following table

Input Ratings	Fuse Ratings	Maker	Order No.
100~120 VAC	2AH/250V	Littelfuse	216_code002
200~240 VAC	2AH/250V	Littelfuse	216_code002

9.5 Service information

1) Repair

If can't solve matters after checking self-diagnosis and repairing manual shoud contact sales agent
When you ask service to sales agent send the machine information of the labelling

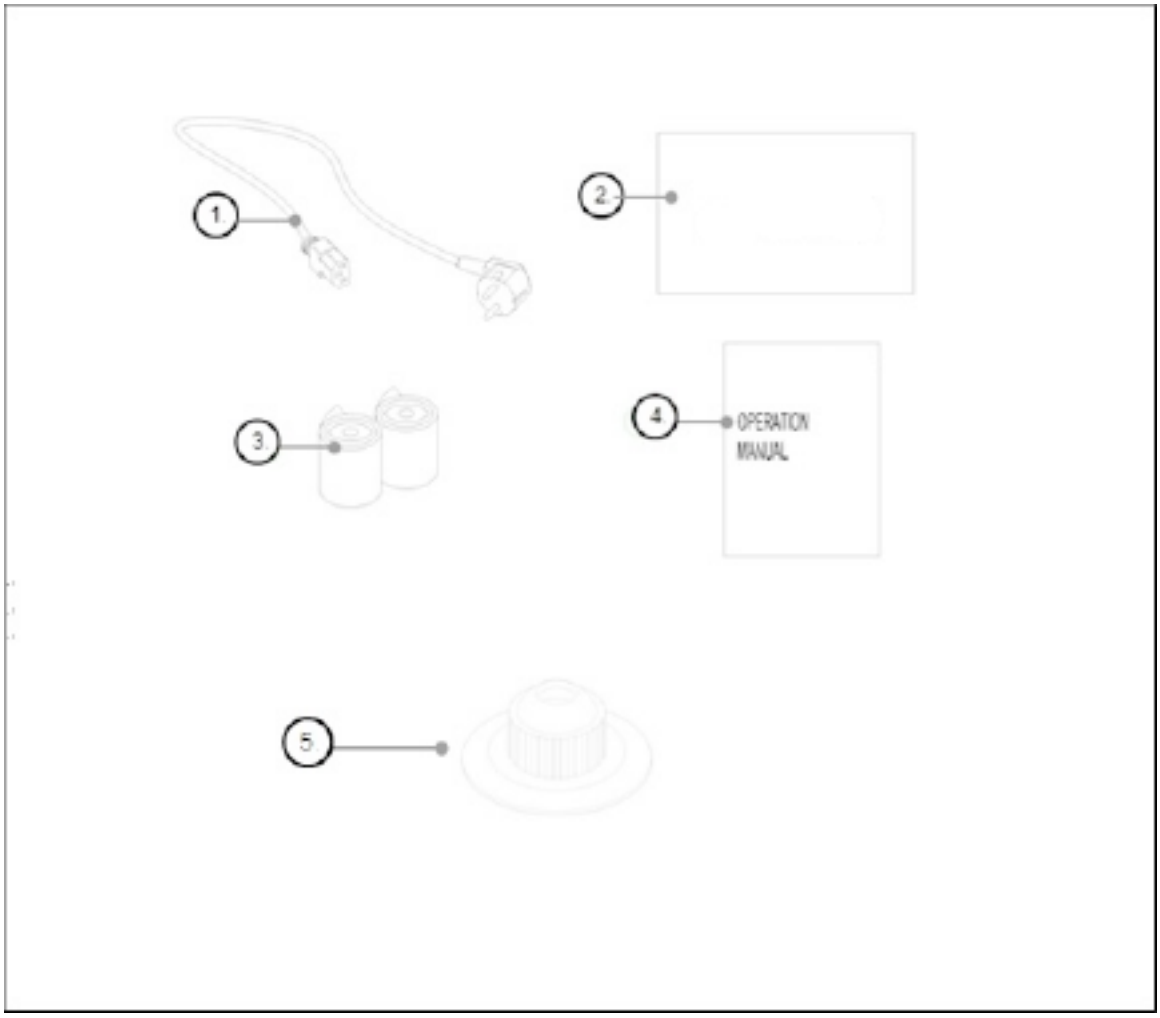
(1) model name	: ELM-9000
(2) serial number	: it's showed on the labelling
(3) problem	: explain detailed informaiton
(4) Labelling size	: 70mm(W) X 31mm(H)

[Fig. 9-3] Labelling

10. Specification

Measurement Range		
Spherical Power (SPH)	-25.00 ~ +25.00D (VD 12mm)	Increments: 0.01/0.06/0.12/0.25D
Cylinderical Power(CYL)	0.00 ~ ±10.00D	Increments: 0.01/0.06/0.12/0.25D Form : -/+/+-
Axis	1 ~ 180°	Increments: 1°
Addition Power	0.00 ~ ±10.00D	Increments: 0.01/0.06/0.12/0.25D
Prism Power	0.00 ~ 10.00Δ	Increments: 0.01/0.06/0.12/0.25Δ Form : OFF/X-Y/P-B
Pupil Distance(PD)	10 ~ 80mm	
Applicable lenses		
Applicable Lens type	Single lens / double focal lens / Three focal lens / progressive multifocal lens	
	Hard contact lens / Soft contact lens (a special accessory is required respectively)	
Lens diameter	000 ~ 100mm	
Note		
Data Out	RS-232C	
Internal Printer	Thermal printer	
Display	7.0 inch TFT COLOR LCD Monitor, Touch	
Operation environment	Temperature : +10℃ ~ +40℃ Humidity : 30% ~ 90% RH Atmospheric pressure range : 70 kPa ~ 106 kPa Shock (without packaging) : 10g / 6ms	
Storage and environmental condition	Temperature : -40℃ ~ +70℃ Humidity : 10% ~ 95% RH Atmospheric pressure range : 50 kPa ~ 106 kPa Shock : 30g / 6ms Permanent shock : 10g / 6ms Oscillate(sine curve) : 10Hz ~ 500Hz, 0.5g	
Power supply	AC100V ~ 240V. 50/60Hz	
Power consumption	25 ~ 50VA	
Dimension	175mm(W) x 255.5mm(D) x 478mm(H)	
Weight	5.25kg	

11. Accessory

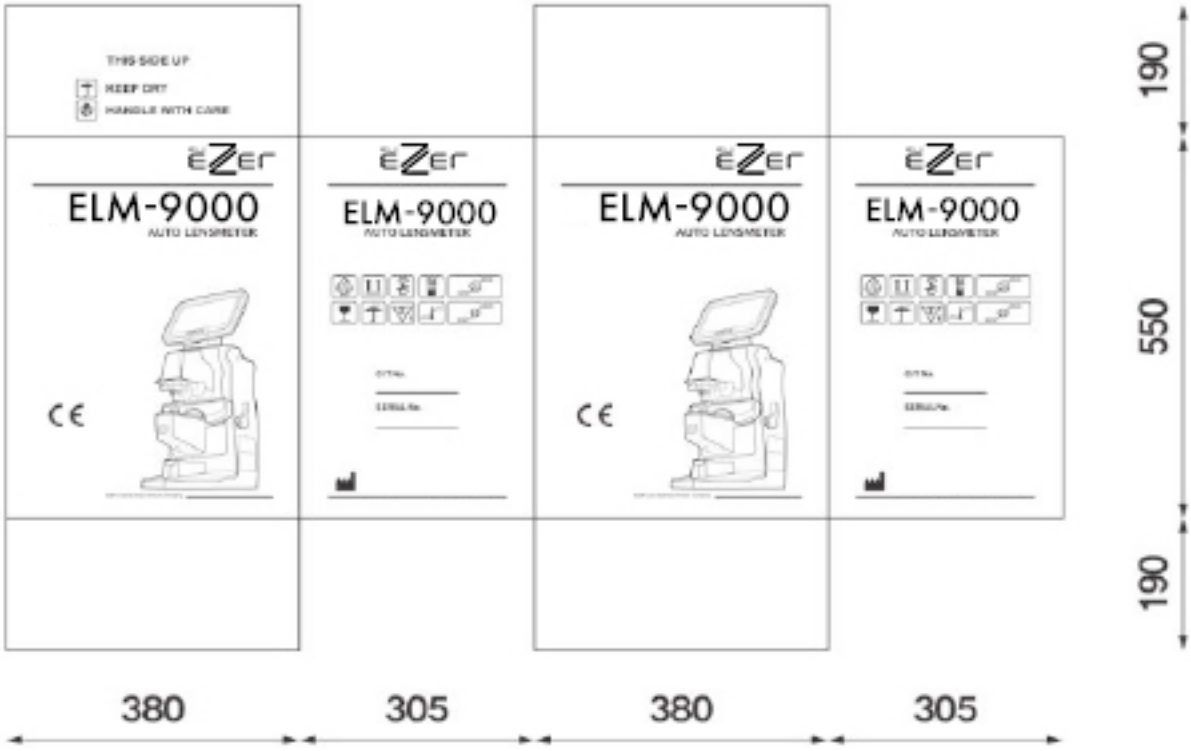


[Fig. 11-1] ELM-9000 Accessory

Name	Standard	Quantity
① Power cord	H05VV-F 175mm, 3G 0.75mm², 175mm	1EA
② Printer paper	55 * 30 mm	2 rolls
③ Dust cover	to be explain	1EA
④ User Manual	B5(254mm X 180mm)	1EA
⑤Nosepiece for contact lenses		1EA

12. Packing

12.1 Packing Foam Design



[Fig. 12-1] ELM-9000 Packing Box

12.2 Packaging step

Step 1	Air Pack : BOTTOM & TOP Material : LL PPE Thickness : 160u 50P(12+1) * 1,100mm Pillar Composition :50	
Step 2	Air Pack : LCD protection Material : LL PPE Thickness : 160u 50P(4+1) * 600mm Pillar Composition :50	
Step 3	Paper box packaging Material : KLB225.K.K.K.KLB225 Size : 380x305x550 Color : 1 degree black, yellow	
Step 4	Rope packaging Material : P.P Size : 15mm Color : yellow	
Step 5	Finish packaging	

	1. To move alone, holding a fall or be dropped. 2. Holding the rope packing to move your fingers can get hurt. 3. The product is damaged packaging may be damaged, so you must contact manufacturer or dealer. 4. The product contaminated by rain damage or risk of electric shock, so you must contact the manufacturer or dealer.
	1. Packaging for the dissolution is opened by gloves. 2. The Cutting rope may be put injury keep both the line hold the demolition.
	1. Do not hold or store inside out move. 2. Do not put heavy things over 20Kg. 3. Do not throw it or fall or pick up from high.

13. EMC (ELECTROMAGNETIC COMPATIBILITY)

The Electromagnetic Compatibility Directive sets the essential requirements for electrical and electronic equipment that may disturb or even be disturbed by other equipment. The ELM-9000 complies with these requirements as tabled below. Follow the guidance on the tables for use of the device in the electromagnetic environment.

EMC (IEC 60601-1-2: 2007)

<table>
<tr><td colspan="3">Guidance and manufacturer's declaration - electromagnetic emissions</td></tr>
<tr><td colspan="3">The ELM-9000 is intended for use in the electromagnetic environment specified below. The customer or the user of the ELM-9000 should assure that it is used in such an environment.</td></tr>
<tr><td>Emissions test</td><td>Compliance</td><td>Electromagnetic environment - guidance</td></tr>
<tr><td>RF emissions
CISPR 11</td><td>Group 1</td><td>The ELM-9000 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.</td></tr>
<tr><td>RF emissions
CISPR 11</td><td>Class B</td><td rowspan="3">The ELM-9000 is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purpose.</td></tr>
<tr><td>Harmonic emissions
IEC 61000-3-2</td><td>Class A</td></tr>
<tr><td>Voltage fluctuations/
Flicker emissions
IEC 61000-3-3</td><td>Complies</td></tr>
</table>

Guidance and manufacturer's declaration - electromagnetic immunity			
The ELM-9000 is intended for use in the electromagnetic environment specified below. The customer or the user of the ELM-9000 should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic Discharge (ESD) IEC 61000-4-2	±6kV contact ±8kV air	±6kV contact ±8kV air	Floor should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2kV for power supply lines ±1kV for input/output lines	±2kV for power supply lines ±1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1kV differential mode ±2kV common mode	±1kV differential mode ±2kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage, dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% UT (>95% dip in UT) for 0,5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles < 5% UT (> 95% dip in UT) for 5 sec	<5% UT (> 95% dip in UT) for 0,5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles < 5% UT (> 95% dip in UT) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the ELM-9000 requires continued operation during power mains interruptions, it is recommended that the ELM-9000 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE UT is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity			
The ELM-9000 is intended for use in the electromagnetic environment specified below. The customer or the user of the ELM-9000 should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conduted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3Vrms 150kHz to 80MHz 3V/m 80MHz to 2,5GHz	3Vrms (V1=3) 3V/m (E1=3)	Portable and mobile RF communications equipment should be used no closer to any part of the ELM-9000, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance d=1.2 root(P) d=1.2 root (P) 80MHz to 800MHz d=2.3 root (P) 800MHz to 2,5GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres(m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,a should be less than the compliance level in each frequency range.b Interference may occur in the vicinity of equipment marked with the following symbol:
NOTE 1 At 80MHz and 800MHz, the higher frequency range applies. NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the ELM-9000 is used exceeds the applicable RF compliance level above, the ELM-9000 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the ELM-9000. b Over the frequency range 150kHz to 80MHz, field strengths should be less than 3V/m.			

Recommended separation distances between portable and mobile RF communications equipment and the ELM-9000

The ELM-9000 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the ELM-9000 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the ELM-9000 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150kHz to 80MHz d=1.2 root(P)	80MHz to 800MHz d=1.2 root(P)	800MHz to 2,5GHz d=2.3 root(P)
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.79
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80MHz and 800MHz, the separation distance for the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

<table>
<tr><td colspan="4">Guidance and manufacturer's declaration - electromagnetic immunity</td></tr>
<tr><td colspan="4">The EDR-7800 is intended for use in the electromagnetic environment specified below. The customer or the user of the EDR-7800 should assure that it is used in such an environment.</td></tr>
<tr><td>Immunity test</td><td>IEC 60601 test level</td><td>Compliance level</td><td>Electromagnetic environment - guidance</td></tr>
<tr><td>Conduted RF
IEC 61000-4-6

Radiated RF
IEC 61000-4-3</td><td>3Vrms
150kHz to 80MHz

3V/m
80MHz to 2,5GHz</td><td>3Vrms
(V1=3)

3V/m
(E1=3)</td><td>Portable and mobile RF communications equipment should be used no closer to any part of the EDR-7800, including cables, than the recommended separation distance calculated
from the equation applicable to the frequency of the transmitter.

Recommended separation distance
d=1.2 root(P)
d=1.2 root (P) 80MHz to 800MHz
d=2.3 root (P) 800MHz to 2,5GHz

where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the
recommended separation distance in metres(m).

Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, a
should be less than the compliance level in each frequency range. b
Interference may occur in the vicinity of equipment marked with the following symbol:

 </td></tr>
<tr><td colspan="4">NOTE 1 At 80MHz and 800MHz, the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</td></tr>
<tr><td colspan="4">a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the EDR-7800 is used exceeds the applicable RF compliance level above, the EDR-7800 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the EDR-7800.
b Over the frequency range 150kHz to 80MHz, field strengths should be less than 3V/m.</td></tr>
</table>

Recommended separation distances between portable and mobile RF communications equipment and the EDR-7800

The EDR-7800 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the EDR-7800 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the EDR-7800 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150kHz to 80MHz d=1.2 root(P)	80MHz to 800MHz d=1.2 root(P)	800MHz to 2,5GHz d=2.3 root(P)
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.79
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80MHz and 800MHz, the separation distance for the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

ELM-9000A Digital Lensmeter

9990 NW 14 Street | Suite 105 | Doral, FL 33172
Telephone: 888.334.4640